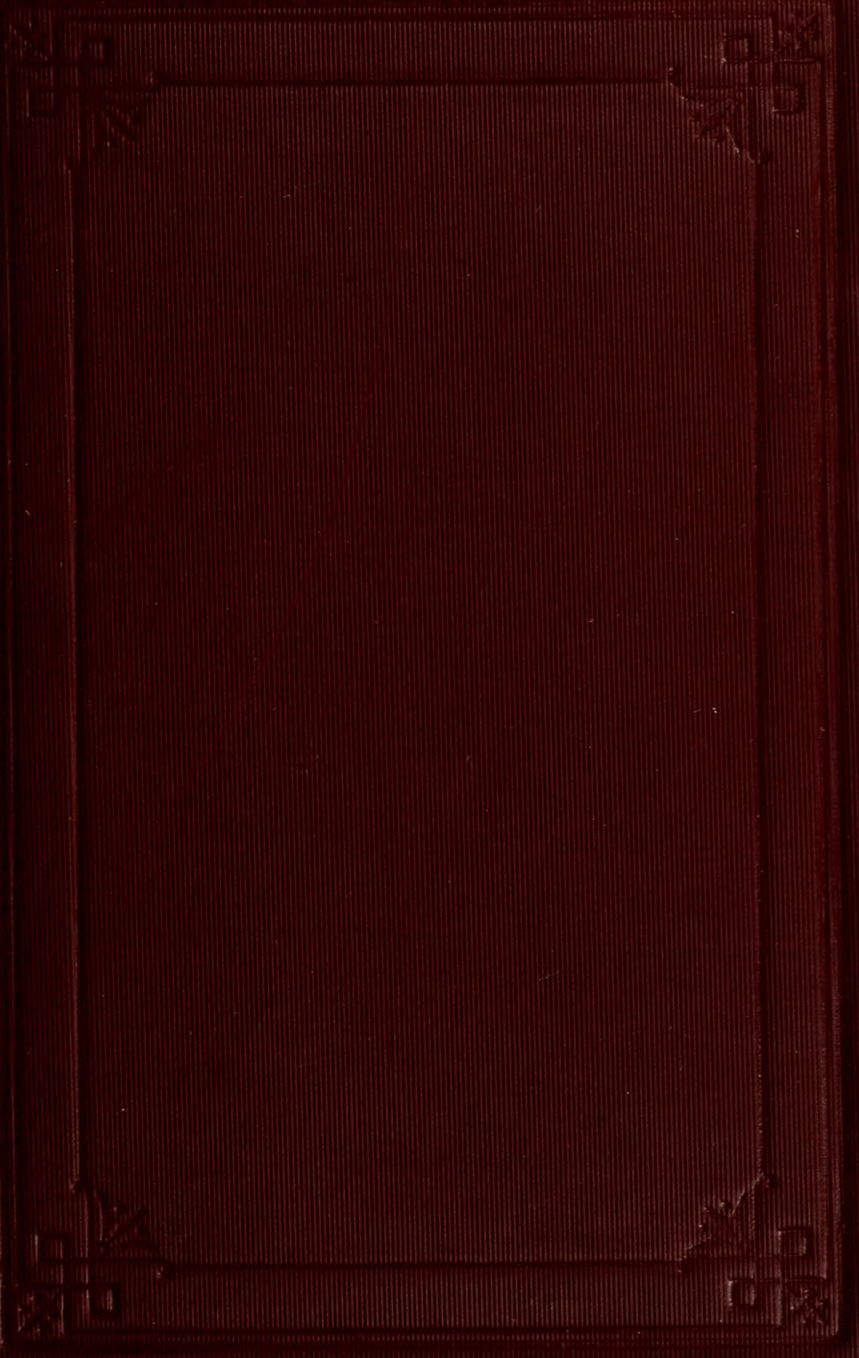

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PEDIATRICS.

THE NEW-BORN.

The Nitrogenous and Sugar Content of the Blood of the New-Born. Analyses of the blood of normal new-born infants, made by J. P. Sedgewick and M. R. Ziegler,[1] show that the values for creatin plus creatinin and non-protein nitrogen are high during the first few days of life corresponding with the high values for uric acid during that period. The creatinin and sugar values are essentially the same as the adult normal values, and the urea nitrogen is near the maximum normal value for adults.

The Newer Knowledge of the New-Born. The latest additions to our knowledge of the new-born are reviewed by A. G. Mitchell.[2] In discussing these diseases of the new-born the author says:

There are certain diseases that are peculiar to the new-born. With some of these we are quite familiar and they often present obvious symptoms. Suffice it to mention, in this connection, hereditary syphilis, which usually presents manifestations before the end of the first month of life; atelectasis; the several varieties of icterus; the acute pyogenic infections of the new-born, including ophthalmia and pemphigus, tetanus and the hemorrhagic diseases. One should be on the lookout for meningitis, as it occurs in very early life and may have as an etiologic organism the tubercle bacillus, *B. coli communis,* meningococcus, *M. catarrhalis,* pneumococcus, *B. mucosus capsulatus,* staphylococcus, streptococcus, *B. pyocyaneus* or *B. lactis aërogenes.* It is no longer doubtful that tuberculosis may be a congenitally transmitted disease.

One is accustomed to thinking of the young baby as immune to the common contagious diseases. While this is true to a large extent, nevertheless diphtheria, scar-

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(1) Amer. Jour. Dis. of Child., June, 1920.
(2) Archiv. Pediatrics, March, 1920.

let fever, measles, whooping cough and smallpox do occur in the new-born. Diphtheria is a disease uncommon in very young infants but only those babies are insusceptible whose mothers have immunity; others are susceptible from birth. Scarlet fever has been reported in a new-born infant. As to measles, infants under 2 months of age are usually immune. The immunity is probably conveyed through the placental circulation, only those infants whose mothers have had the disease seeming to enjoy this immunity. Measles has been reported in infants as young as 16 days. Whooping cough has begun as early as the fourth day of life with distinct whooping on the eighth day.

Pneumonia in the first few days of life is not so uncommon. This has been proven by autopsy. Pneumonia and pulmonary inflammations at this age have been considered to be infections of umbilical origin. Pyelitis may occur in the new-born. Gall-stones have been found in new-born infants at autopsy. Polycystic kidney is reported in the very young infant. The appendix has been successfully removed from an infant twelve hours after birth.

Thus it is evident that not only must the new-born infant combat certain diseases that belong to his time of life, but he is also occasionally liable to diseases that commonly affect older children.

Care of the New-Born with Especial Reference to Premature Infants. E. J. Huenekens[3] calls attention to the large number of cerebral injuries at birth, not only in forceps cases but even in easy natural births. Hemorrhage of the brain occurs in a large proportion of births, but many are slight and symptomless. A bulging fontanelle is very significant. Blood-stained spinal fluid usually establishes the diagnosis. Cerebral hemorrhage occurs in 50 per cent of new-born infants. [This figure strikes us as being extremely high.—Ed.] The condition is brought about by trauma in normal or rapid deliveries, by congestion or asphyxiation in slow deliveries, or by disease of the child itself.

Melena neonatorum is common and is treated by whole

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(3) Northwest Med., August, 1919.

blood by means of intramuscular injections or by sinus transfusion. The results are usually good.

In a large proportion of cases of congenital lues the infants are born apparently normal and with a negative Wassermann but give a positive Wassermann in the first or second month. A negative Wassermann at birth does not exclude syphilis.

Fever in the first few days after birth is relatively frequent. The condition is contracted from the mother or nurse and is too common; it may result in otitis, meningitis, etc. The external room temperature is highly important; it should be from 70° to 72° F. and not at 80° to 85° F., which is usual in hospitals.

The prevalent idea among physicians that many mothers can not nurse their babies is erroneous; 95 per cent of mothers can and should. The breasts should be thoroughly emptied. There is no such thing as poor breast milk. The practice of complementing or supplementing breast feeding with bottle feeding is bad, as the breast milk is diminished and the baby soon refuses to nurse.

As regards premature infants the author advises the following:

Feed every four hours;

Avoid chilling of the body surface.

The deficiency in the supply of calcium must be made up. The author has used tricalcium phosphate and cod-liver oil with good results.

[The point which the author makes concerning the room temperature should be emphasized. Premature infants do best when the temperature of the room is from 70° to 72° F., and when the temperature of the incubator is from 75° to 76° F.—Ed.]

The Acidotic State of Normal New-Borns with Special Reference to the Alveolar CO_2 Tension, Alkali Tolerance and Acetonuria. M. Seham[4] reviews the outstanding work on the acidotic state of normal new-borns. In 1914, Ylippo gave the incentive to the study of this subject. He claims to have found the following: (1) that the human organism at birth is in a state of "physiologic acidosis;" (2) that the blood shows an "acidotic

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(4) Amer. Jour. Dis. Child., July, 1919.

constitution;" (3) that the CO_2 dissociation curve of the blood of new-borns shows an acidosis (20 per cent less than adults), and (4) that the hydrogen-ion concentration is uniformly higher than in adults.

Of the various methods for determining acidosis, the two most accurate are (1) the chemical study of the blood, and (2) the study of the CO_2 alveolar tension. The method for determining the CO_2 alveolar tension is simple and in most conditions an accurate one for determining acidosis. So far, the author believes this has never been determined in new-borns.

Seham made 151 determinations on fifty babies. The youngest was 1 hour, and the oldest 32 weeks old. The majority were from 1 day to 1 week old, and there were two premature babies, one 7 months old and the other 8 months old. The effects of food and exercise (crying and struggling) on the CO_2 tension were studied, as well as the various methods for obtaining the alveolar air.

Both Haldane's and Linhard's methods were found by the author impractical because they need the coöperation of the patient. Higgins' modification of Plesch's method was found to be the most advantageous in working with the new-borns. The pulmotor mask for new-borns which could be applied very snugly to the face, was used in place of the hygeia nipple with the rubber tubing over the mouth, as suggested by Howland.

The author comes to the following conclusions:

Alveolar CO_2 tension is a practical index of acidosis.

Fifty cubic centimeters of air in the bag, over a period of 30 seconds for breathing, gives the most constant results.

The modification of Plesch-Higgins' method of collecting air with the use of the pulmotor mask is the most practical way of collecting air from new-borns.

Seham has not been able to establish a lower CO_2 tension which is indicative of the so-called acidotic state.

The ingestion of food, or starvation and muscular exercise under these conditions, has no demonstrable effect of the alveolar CO_2 tension.

The urine of the normal new-born is nearly always acid.

It takes on an average 1.7 gm. of sodium bicarbonate to turn the urine from acid to alkaline, giving 0.16 gm. every two hours by mouth. The results with the alkali tolerance test for normal new-borns do not indicate an acidosis.

Practically no acetone is found in the urine of normal new-borns.

The Nutrition of the Fetus. J. M. Slemons[5] investigated the question: "Does the material provided for the growth of the ovum come from the mother's tissues or from her food?"

The needs for the growth of the fetus are considered, *viz.,* protein, amino-acids, nitrogenous waste products blood sugar, fats and lipoids.

The physiologic action of the blood-supply of the fetus and of the mother through the placenta is considered. It can not be inferred that what is true of placental interchange at full term is also true for the earlier months of pregnancy. The simplification of the placental partition occurs at about the eighteenth to twentieth week of pregnancy and with it is associated a period of more rapid growth of the fetus. At least during the latter half of pregnancy the placental partition behaves as a semipermeable membrane. The amino-acids from which the fetal protein is built and glucose pass the membrane freely. Probably the supply of water and inorganic salts is regulated on the same basis. It is impossible to say how the iron found in the fetus is transported to it. The fats and lipoids of the mother's blood are held in check by the placenta and the fetus manufactures these out of some other material, probably glucose, contributed by the mother. There is a high fat content in the blood of the pregnant woman and a much lower one in the blood of the fetus.

All the fetal waste products pass through the placenta.

The nutrition of the fetus in the final analysis involves two factors: the peculiar activity of its own organs and the supply of food they receive. The first is most difficult of solution because the fetus can not be isolated. The second factor has been brought within the range of direct observation. Thus there is no diet specifically

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(5) Amer. Jour. Obst., August, 1919.

adapted to the state of pregnancy; the prospective mother may exercise the same freedom as anyone else as regards her food; she should choose whatever will agree with her and avoid what she can not digest. The doctrine that she should "eat for two" is erroneous. A diet which was previously ample will suffice during pregnancy. An over-abundance of food is much more likely to cause discomfort than insufficient nourishment. So long as the mother's health is properly maintained no thought need be given to the size of the fetus.

Grave Familial Jaundice of the New-Born. The following description of the disease is given by H. Rollston:[6]

In grave familial jaundice successive infants become jaundiced a few hours to a day after birth, pass into a drowsy condition, and usually die within a week, often with convulsions; it resembles physiologic jaundice in its onset; and, like it, does not show any gross postmortem appearances to account for the jaundice.

The treatment is uncertain. Working on the hypothesis that grave familial jaundice of the new-born is due to fetal toxemia of maternal origin, the prophylaxis should consist in care of the mother's diet and the administration of intestinal and biliary antiseptics such as hexamine, salicylate of sodium, minute doses (1/20 gr.) of calomel, tetrachloride of naphthaline, salol, and guaiacol. Ballantyne recommends chloride of calcium.

The infant should be treated with small doses of calomel, which some authors consider to have done good, and should not be given the breast.

[The disease frequently occurs in successive pregnancies and the mothers usually enjoy perfect health. Knapfelmacher, who reviewed the literature in a critical way, inclined to the view that the disease in infants was due to some septic process. This theory lacks adequate proof. Rollston's view that the disease is due to a toxemia of pregnancy is not borne out by clinical experience. Few if any of the mothers of these infants have shown toxemia of pregnancy. It is probably no closer to the mark to say that these babies are born with congenitally inadequate livers and are unable to sur-

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(6) Practitioner, January, 1920.

vive on account of insufficiency of liver function. Nevertheless, this is the impression one receives from studying and observing these babies.—Ed.]

The Hemorrhagic Tendency as a Frequent Cause of Cranial Hemorrhage of the New-Born. The tendency toward hemorrhage in the new-born, according to J. A. Foote,[7] is frequently first manifested as intracranial hemorrhage, and it is important to recognize that this may be and often is a local manifestation of a general condition.

The early use of lumbar puncture and the hypodermic administration of substances that tend to increase blood coagulability are rationally indicated in every case of suspected intracranial hemorrhage of the new-born, even prior to operation.

The suggestion that blood coagulation tests be performed as a routine on the new-born infant is one that merits consideration.

The Importance of Lumbar Puncture in Intracranial Hemorrhage of the New-Born. J. B. Sidbury[8] discusses the etiology, pathology and symptoms of intracranial hemorrhage of the new-born. He divides the causes of this condition into two general heads. First, spontaneous, or hemorrhage due to a general condition, as hemorrhage of the new-born; the second and most common cause is traumatism. Under this head the most common causes are: (1) prolonged, tedious or hard labor, with or without instruments; (2) precipitate labor with injury of the child's head; (3) injudicious use of pituitary extract; (4) breech extraction of the aftercoming head; (5) premature babies, who usually have very fragile blood-vessels, which are not strong enough to undergo the amount of pressure necessary even in a normal delivery, hence their predisposition to this condition.

It is unquestionably true that a large majority of the infantile cerebral paralyses occur either in first-born children or in those who have been born after prolonged, dry, hard labors. That prolonged, hard labor is a most important factor in the production of this condition

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(7) Amer. Jour. Dis. Child., July, 1920.
(8) Archives Pediatrics, September, 1920.

goes without question. The early, intelligent application of the forceps will reduce the length of labor, thereby reducing the length of time the head has to undergo this pressure. Other things being equal and the mother's condition good, the author believes it wiser to cut down the period of labor and not wait until the mother is exhausted and the fetal heart is imperceptible before offering help.

The symptoms may not be well defined. To have a new-born baby nurse well for two or three days and then refuse to nurse, become pale and listless with intermittent periods of crying spells followed by stupor and perhaps convulsions or twitchings of one or more muscle groups should make one think of a hemorrhage, and especially so if the mother had a hard or instrumental delivery. Convulsions following an instrumental delivery should always make one suspect this condition. The following are the signs to bear in mind: convulsions or twitchings of one or more extremities, bulging fontannelle (not a constant sign), nystagmus, strabismus, which is more or less constant, increased reflexes, which may be more marked on one side. Stiff neck and Kernig's sign may be present if the irritation is confined more to the base of the brain. The pulse is strong, full and at times slow. The respirations are irregular, they may be superficial and rapid or they may be slow and deep or may even simulate the Cheyne-Stokes phenomenon.

In treatment the author advises that in all cases of birth hemorrhage, a lumbar puncture should be done for diagnostic as well as for therapeutic purposes. Repeated daily lumbar punctures, until the spinal fluid is clear of blood, are indicated in these cases with the use of a manometer to register the intracranial pressure each time. By this means, one can determine whether the pressure has been reduced to normal as well as drain off as much blood as may come by this route. After having done this, if there are any focal signs, such as twitching of any group of muscles or eye signs, as papillitis or marked venous engorgement of the retinal veins, a decompression operation should be considered.

Congenital Debility. Congenital debility is a term adopted by A. Moussous,[9] to signify the state of constitutional inferiority in which new-born infants are brought into the world.

Most of these infants are premature; but not all premature infants are necessarily bound to be congenitally debilitated.

As premature children grow up, those that are congenitally weak will separate themselves by degrees from those who are not. The latter will gradually approximate to normal conditions; the former will not. The debilitated premature infants especially show gastro-intestinal troubles, which are predominant and result from a certain thickening of parts of the viscera; they also show liver troubles.

Congenital debility almost always bears some relation to syphilis, tuberculosis or alcoholism in the parents.

The remedy is prophylaxis through treatment of the parents. The author believes that it would be wise to organize and extend clinics for the examination and treatment of pregnant women and the creation of asylums for expectant mothers.

INFANT FEEDING.

The von Pirquet Feeding System. B. Schick[1] gives an account of the system of feeding promulgated by von Pirquet.

The system consists of two main parts: (1) Replacing the calorie by a more simple term—NEM; (2) A scheme by which the amount of food required by the individual can be figured out.

v. Pirquet believes that the term "calorie" is vague and that in order to make the practice of feeding accessible to more people it is necessary to compare a given food with another food of known chemical and caloric value. This can be done best by comparing all foods to a gram of mother's milk which has the following composition: protein 1.7 per cent., fat 3.7 per cent., sugar 6.7 per cent., and for the sake of brevity the term NEM

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(9) Jour. de méd. de Bordeaux, June 25, 1919.
(1) Ergebn. d. Innere Med., Vol. 16, 1919.

(Nutritionis Elementum) is adopted for the value of one gram of mother's milk. The NEM can also be expressed in larger or smaller quantities thus:

0.001—1 Millinem.
0.01—1 Centinem.
0.1—1 Decinem.
10 NEM—1 Dekanem.
100 NEM—1 Hektonem.
1000 NEM—1 Tonnem.

Schick quotes many figures to illustrate how easily the NEM can be used, as a nutritional unit.

The second problem, that of determining the amount of food an individual requires, involves a good deal of mathematical calculations, but was brought down by v. Pirquet to a simple formula to be used by the physician or even by the layman interested in nutrition.

v. Pirquet believes that the intestinal area can serve as a basis for the amount of food an individual requires. To find the intestinal area, v. Pirquet made use of the work of Henning in 1881, who proved that the length of the intestines in children and adults equals ten times the sitting height. The width of the intestine, while it varies in different individuals is taken by v. Pirquet as one-tenth of the sitting height. The surface area of the intestine thus equals

$$\frac{10\ Si \times Si}{10} \quad \text{or } Si^2$$

In order to figure out the daily requirements of food it is necessary to keep in mind that there is a maximum, minimum and optimum food requirement.

The minimum requirement consists of the amount of food necessary to replace the wear and tear used up by the inner working of the body, such as the work of the heart, of the respiratory apparatus and the glands. The maximum requirement is the largest amount of food the stomach and bowels can take care of, in other words, the tolerance limit. The optimum requirement is the amount of food necessary for a well functionating body to maintain health and to thrive.

For the maximum amount, I Nem is necessary for every Cm^2 of intestinal surface. As the intestinal surface equals Si^2 CM^2 the maximum of food equals Si^2 Nem. For instance the maximum of food in twenty-four hours for an infant of 40 cm sitting height is equal to 40^2 or 1,600 Nem. In a breast-fed infant it equals 1,600 gram of mother's milk. In an older child the food is not milk, but the total amount equals 1,600 grams of milk.

The minimum daily food is usually 3/10 of the maximum amount or 3/10 Siqua, so an infant measuring 40 cm sitting height requires 1,600x3/10 Nem as its minimum, or 480 Nem (grams of mother's milk.) A certain amount of food must be allowed for growth. One decinem is sufficient for that. One decinem is also allowed for fat deposit, so that we have in infants 3 decinem siqua for the minimum, 1 decinem for growth, one or 2 decinem for fat, making a total of 5 or 6 decinem.

In the second half year, 1 decinem is also added for muscular movements, making a total of 6 to 7 decinem siqua. Suppose the child at this age has a sitting height of 40 cm, it is to get 1,600x7/10 Nem or 1,120 Nem. This can be given in the form of milk and cereals, for instance, the child may be given 5x160 grams (800 grams) of half milk with 68 grams of sugar. In addition to this, farina gruel of 160 grams can be given 2 times which equals 320 Nem. This will make the total for the day 1,120 Nem.

v. Pirquet has prepared a table for the Nem value of all foods used so that all one has to do, according to the author, is to refer to the table, and figure out the amount of Nem required and the Nem value for each food.

[The v. Pirquet feeding system is unique in many ways, and while at first glance it seems complicated it is in reality only another plan for calculating the amount of food required for normal growth and development. It is almost too soon to pass critical judgment on the universal adoption of this feeding plan.—Ed.]

A Study of the Lactose, Fat and Protein Content of Women's Milk. A comparative study of the chemical composition of breast milk at various stages of lactation, at different times of the day and at beginning and end of nursing was made by W. Denis, and F. B. Talbot.[2]

They found that the amount of lactose was low in colostrum, as has already been described by other investigators. In one instance in which the mother had pneumonia, it was necessary to pump the breasts for six days. The total amount of milk diminished until only one ounce could be obtained on the last day. When the baby was five days old, the milk contained 5.8 per cent. sugar; when six days old, the milk contained 5.1 per cent. sugar, and when eleven days old, the milk contained 4.55 per cent. sugar. This sequence of events was probably due to the drying up of the milk rather than to the pneumonia, and is suggestive of what may be expected at the time of weaning. Further investigations are necessary to settle this point. The average amount of lactose in sixty samples was 7.19 per cent. There was a general tendency for the concentration of lactose to increase throughout the period of lactation. During the first ten weeks, two-thirds of the samples of milk contained less than 7 per cent. lactose. After the tenth week there were four times as many samples which contained between 7 and 8 per cent. of lactose. The weakest milk, after the colostrum period, contained 5.49 per cent. of lactose and the richest 8.35 per cent.

The percentage of fat in the milk of different women varied within wide limits, the lowest mixed milk being 1.5 per cent., and the highest 9.9 per cent. The average amount of fat in the mixed samples was 3 per cent., which is the same as that found in 119 Russian women by Skvortzov, and lower than the 4.5 per cent. found by Engel in ten German wet-nurses. If wet-nurses only are taken, the average of thirty-five samples is 4.18 per cent. of fat. There does not seem to be any relation between the stage of lactation and the amount of fat in the milk. It seems more probable that the percentage of fat depends more on how completely the breasts are drained and how much of the late milk gets into the sample.

The protein is highest, as would be expected, during the colostrum period. There is a general tendency for

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(2) Amer. Jour. Dis. Child., August, 1919.

the amount of protein to diminish as lactation progresses. It is usually over 1.5 per cent. up to the fourth week and after the twelfth week it averages below 1.2 per cent., the lowest being 1 per cent. So far as the authors were able to determine there is no relation between the character of the stools and the amount of total protein.

The percentage of fat, on the other hand, is much greater at the end of the nursing than at the beginning. One example of extreme variation was found in two samples where there was 0.66 per cent. fat before nursing, and 10 per cent. after nursing. As a rule, the differences before and after nursing are not so great; and there was usually less than 4 per cent difference. An occasional sample was very rich, both at the beginning and at the end of nursing. Occasionally two samples, one taken before and one after nursing, showed very little change, and in the rare case the milk after nursing showed less fat than before nursing.

The protein showed less difference in percentage than the fat. It rarely varied more than a few tenths between the beginning and end of nursing. Sometimes it was lower after nursing, and sometimes higher.

The above results, the authors state, emphasize the importance of analyses of milk, both before and after nursing, and the uselessness of analyses made as is too frequently the case on the first ounce of milk drawn.

There was a tendency for the volume of the milk to diminish as the day went on, the smallest amount being obtained at 3 p. m. or later. There was very little variation in the amount of lactose and protein, and no rule can be devised from these cases. There were striking variations in the amount of fat, and there was a tendency for its concentration to be greater at noon or in the afternoon than at other times of day. There was no relation, however, between the percentage of fat found and the amount of milk drawn from the breast.

Some Facts and Fallacies Relating to Maternal Feeding of Infants. According to J. D. Love,[3] the gross appearance of breast milk furnishes but an unreliable index as to its suitability for the baby. Before pronounc-

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(3) Southern Med. Jour., January, 1920.

ing milk as being too rich in quality, the presence or absence of colostrum bodies should have been determined by microscopic examination. The mere fact that milk is scant in quantity furnishes no valid excuse for the withdrawal of the infant from the breast, but rather calls for supplemental feedings.

Conclusions drawn from chemical examinations of breast milk, as usually practiced, are apt to be misleading. Laboratory findings should confirm clinical observation.

In influencing the quality of breast milk the maternal dietary, while of some importance, is a smaller factor than other causes which operate through the medium of the mother's nervous system.

Do Calories Measure the Value of Food? H. D. Chapin[4] believes that it is necessary to re-examine some of the foundations of our teachings of nutrition and see if they are altogether sound.

He reminds the reader that heat or energy may be produced by chemical cleavage as well as by oxidation. Heat may be a degradation of energy, and in the human body it is an excretion. Heat measurement alone is not a safe guide for the calculation of food values. This is especially true at the beginning of life when growth is the all-important factor. The foods that build rather than those that readily undergo oxidation must be properly gauged if we are to have healthy development.

A false theory does harm in that it points in the wrong direction, and it is a question whether it is not time to weigh carefully the caloric theory of feeding and restrict or partially abandon its use. To take its place, a system of teaching must be constructed based on a knowledge of the physiologic properties of the various food elements. Some form of biologic testing of foods must be elaborated if an always reliable gauge of nutrition is to be established.

The Calorie as a Unit in Figuring Milk Modifications. T. J. Putnam[5] believes that the method of calculating milk modifications according to the absolute caloric values of the respective food elements is as rational as

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(4) Jour. Amer. Med. Ass'n., Dec. 27, 1919.

(5) Boston Med. and Surg. Jour., Jan. 29, 1920.

the present methods of calculation by percentage composition and volume, or by total caloric value.

The use of the calorie as a unit in expressing the composition of milks is of advantage, in that all food elements are reduced to a common standard.

Such a view of infants' diet might lead to a clearer comprehension of the subject by some practitioners.

It would allow of easy manipulation of the fluid volume apart from the food value, of various mixtures; and might lead to the accumulation of more data concerning the effects of alterations in fluid volume.

It would facilitate the extension of the calculation of the diet into late infancy, when desirable.

The calculation of modifications would be simpler in many ways, and more easily understood, than under many of the present systems. Alterations of one constituent without changing the others would be particularly simplified, but the possible advantages gained by such a method of calculation are probably scarcely sufficient to warrant its adoption in place of the present well-tried and well-known procedures.

Food Value of the Milk of the Water Buffalo. W. W. Cadbury[6] found that milk of the water buffalo, an animal used by Chinese farmers for ploughing the rice fields, is wholesome and palatable when produced under sanitary conditions. There is little or no odor to it. The strong disagreeable odor sometimes noted in buffalo milk is due largely to dead scales and hair that have fallen into the milk during milking. One small flake of skin or one hair may taint a gallon of milk so that the flavor will be unpleasant. When milk is produced under sanitary conditions it may have an odor when first drawn. This is due to gases in the milk which leave it after the milk has stood for a short time in a clean, well-ventilated room.

The most noticeable fact is the marked excess of fat in water buffalo milk. The average of 12.6 per cent. was the result obtained from frequent analyses of thirty different cows over a period of eighteen months. The lowest average for any individual cow was 11.50 per cent., and the highest was 15.60 per cent. fat. While

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(6) Amer. Jour. Dis. Child., January, 1920.

the fat is almost four times as much as that in the average American cow's milk, the proteid is almost twice as much; the sugar and water are less.

Frozen Milk. H. R. Mixsell[7] reviews the literature on frozen milk. He finds a divergence of opinion on the advisability of feeding frozen milk to infants and because of that he has made it a rule to advise the use of either dry milk or unsweetened condensed milk in cases in which the milk has been frozen—especially among young infants. The author says he heard indirectly, but not in detail, of cases of severe diarrhea following the use of frozen milk and it is on this account that he has recommended the above milk preparations as alternatives. It is possible that a putrefactive diarrhea may ensue, owing to the growth of the putrefying bacteria at low temperatures, and the breaking down of the proteids into amino-acids; or diarrhea may be due to lactic and fatty acid formation. The author himself has never seen any bad effects from the ingestion of frozen milk.

[Scarcely a winter passes but that some cases of alimentary disturbances occur in which frozen milk is suspected of being the cause. The whole subject requires further investigation. In the meantime, one would be compelled to say that the rôle of frozen milk in the production of disease has not been proved.—Ed.]

The Deleterious Effect of the Alkalization of Infants' Food. A. F. Hess and L. J. Unger[8] believe that too little regard is paid to the reaction of the milk preparations that are fed to babies. It is considered quite immaterial, for example, whether sodium bicarbonate is added to a milk formula, or whether a proprietary food is more or less alkaline in reaction. To such an extent is this the case that in stating the composition of proprietary foods, the text-books on children's diseases content themselves with a statement of the protein, fat and carbohydrate content of the various popular preparations, giving no consideration whatsoever to their reaction. In such tables, the salts are expressed in terms of percentages of total ash, the nature of the inorganic con-

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(7) Archiv. Pediatrics, May, 1920.
(8) Jour. Amer. Med. Ass'n., Nov. 1, 1919.

stituents being not specifically mentioned. This is true of American, British, French and German text-books. This neglect is all the more remarkable as for some years it has been appreciated that the salts play an important rôle in infant feeding; indeed, in every effort to construct an artificial food approximating mother's milk, the salt factor has been given particular consideration.

The authors point out that it is by no means immaterial whether we render the baby's milk more or less alkaline. What effect an addition of alkali has on proteins and other caloric food factors it is impossible, in the present state of our knowledge, even to surmise; but that this alteration has a decided effect on the vitamines is susceptible to proof. The authors have shown that orange juice, the prototype of antiscorbutics, and the one most relied on in infant feeding is essentially damaged within twenty-four hours by being rendered twentieth normal alkaline to phenolphthalein. In fact orange juice of this faintly alkaline reaction was found to have lost its power to protect guinea-pigs against scurvy. It is evident, therefore, that the antiscorbutic vitamine is peculiarly sensitive to alkalization.

The authors report the case of a baby who was receiving a diet of malt soup and cereal with the addition of three teaspoonfuls of cod-liver oil a day. It developed scurvy. The symptoms were those commonly associated with this disorder; namely, pallor, hemorrhages of the gums, tenderness of the femur; irritability, and lack of gain in weight.

In view of this occurrence, an attempt was made to cure the scorbutic condition by eliminating the carbohydrate from the diet, by omitting the flour and malt sugar from the formula. In order to accomplish this, a pint of milk was prepared with the addition of sucrose and the same amount of potassium carbonate as is contained in the malt soup formula. This milk, which was fresh and of excellent quality, and contained no malt or flour, was boiled for five minutes. There are many who believe that the carbohydrates, especially the starches, are of great importance in bringing about the so-called deficiency diseases, because they require a considerable amount of vitamine for their metabolism, and lead therefore to such disorders as scurvy or beriberi, if present in relatively high amount. It was found, however, that the harmful influence of the malt soup preparation could not be attributed to its high carbohydrate content, as the exclusion of the flour and the malt did not bring about an alleviation of the symptoms, or lead to a gain in weight. As this form of treatment proved unsuccessful, it was determined to discontinue the addition of the potassium carbonate, so that the baby received a pint of milk that was boiled for five minutes without the addition of alkali. The sucrose, the cereal and the cod-liver oil were continued. The result was striking. Not only did the infant gain in weight, but there was a marked change in its general condition and a disappearance of the various signs and symptoms enumerated above. It seems, therefore, quite evident to the authors that the alkalization of this food, which contains a limited amount of antiscorbutic material—merely that which is contained in a pint of boiled milk—was sufficient to render its antiscorbutic quota insufficient.

As the result of this experience, an experiment on guinea-pigs was instituted with the same results as obtained in the baby.

Rôle of the Antineuritic Vitamine in the Artificial Feeding of Infants. From the results of their investigation A. L. Daniels, A. H. Byfield and R. Loughlin[9] draw the following conclusions:

The addition of the antineuritic vitamine obtained from wheat embryo to the diet of babies furnishes an adequate number of calories to stimulate growth.

The beneficial influence of adding a specially prepared vegetable soup in sufficient quantity as part diluent in the milk modifications for infants is apparently due to the presence of the antineuritic vitamine contained therein. Both the alcoholic soluble material of the dried soup vegetables and the water extract (soup) stimulated growth.

The fact that the artificially fed infant requires a larger amount of food than the breast fed infant appears to be due to the relative paucity of diluted cow's milk in the antineuritic vitamine.

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(9) Amer. Jour. Dis. Child., December, 1919.

It is probable that failure to gain in infants and young children is often the result of an insufficient amount of the antineuritic vitamine in the food. The diets of the young, the authors believe, should be more carefully scrutinized with this in mind.

[The relation of vitamines to the growth and development of infants is a subject which presents increasing interest. Its true significance is not yet unfolded, though its development with reference to infantile convulsions would be of far-reaching importance.—Ed.]

The Constipating Qualities of Orange Juice. H. J. Gerstenberg and W. M. Champion[1] relate the observations made by them on a normal infant 10 months of age to ascertain the relative position as a cathartic or laxative of orange juice to an equal amount of a 10 per cent. sugar solution composed of 6.5 per cent. glucose and 3.5 per cent. sucrose. They found in one period a relative laxative advantage of the sugar solution over the orange juice, or better, a relative constipating ability of orange juice as compared with the effect obtained with the 10 per cent. sugar solution. During the sugar-solution period anywhere from 95.71 to 96.53 per cent. of the water output went by way of the kidneys, and from 4.29 to 3.47 per cent. through the intestines, while in the case of the orange juice from 97.15 to 97.25 per cent. of the fluid output went by way of the kidneys, and from 2.85 to 2.74 per cent. by way of the intestines. In other words, orange juice, relatively speaking, has been less laxative than a 10 per cent. sugar solution when given in doses of 15 c. c., six times in 24 hours.

This observation confirms practical experience that orange juice in the maximum amounts ordinarily used has more of a constipating than a laxative effect, and therefore should only be used as an antiscorbutic or as a diurectic, but not as a laxative, and especially not for children who are already constipated.

These observations also point to the important rôle that diuresis may play in the production of constipation and it may be possible that some of the cases of constipation in infants supposed to be due to an abnormally long retention of the feces in the gut and a consequent

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(1) Amer. Jour. Dis. Child., August, 1919.

too complete absorption of water in the large intestine are primarily due to the presence of a factor that causes an abnormal increase in the excretion of water through the kidneys.

[The results obtained by the authors are interesting, though they are not in full accord with clinical experience. Occasionally mothers tell us that orange juice acts as a laxative in the baby and consequently its use must be discontinued. It must be conceded that in a great many babies the character and frequency of the bowel movements are not affected by orange juice. Is it possible that orange juice may vary in its composition? Perhaps the sugar content is a variable quantity. Orange juice containing much sugar might be laxative, whereas that with a low or moderate sugar content might not be laxative at all.—Ed.]

Precipitins for Egg Albumin in Stools. From a study of 341 stools from fifty-seven infants and children, C. G. Grulee[2] believes that egg albumin is in nearly every instance completely broken down by the digestive processes in infants and children. This holds good not only for children and older infants, but also where the egg albumin is used in small quantities for the new-born as well. There is only one other possibility, and that is that the egg albumin instead of being broken down in the process of digestion is absorbed unchanged. The author does not think that specificity of the precipitin reaction for egg albumin is to any degree disproven by the fact that it was found to be positive in stools where no egg had been present in the diet. He is inclined to attribute such reaction to the complexity of the stool.

CHILD WELFARE.

Results to be Expected from Antenatal Care. E. Holland[3] states that out of every 100 dead-born viable fetuses there are about sixty fresh and forty macerated ones. It is reasonably accurate to state that 60 per cent. of fetal mortality is due to the accidents and complica-

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(2) Amer. Jour. Dis. Child., July, 1920.
(3) Lancet, July 12, 1919.

tions of labor. In other words 60 per cent. are cases of intranatal and 40 per cent. of antenatal deaths.

Antenatal work is the strategy, intranatal work the tactics of preventive obstetrics; measuring the pelvis, finding the presentation, testing the urine, taking a history of previous labors, examination of cavity for tumors, and looking after the general health of the patient, are the antenatal important matters to be investigated.

Syphilis, toxemia of pregnancy, renal disease, placental troubles are the principal causes of antenatal fetal death. 34 per cent. of these are due to syphilis; 20 per cent. to toxemia of pregnancy; 20 per cent. are due to undetermined causes.

The most striking fact is that about half of the stillborn babies show, on postmortem examination, severe cerebral injury in the form of cerebral hemorrhages and rupture of the septa of the dura mater; such injuries can only be due to excessive cranial stress during labor.

Syphilitic cases can be kept within reasonable limit or even cured by antenatal treatment.

A faulty presentation can be rectified prenatally.

Toxemia of pregnancy can be obviated by antenatal treatment.

Contracted and deformed pelves can be discovered in time and the proper obstetrical treatment at term planned. The same applies to tumors.

There are some conditions which are only apparent at the time of labor; there are others for which no known preventive measures exist.

The author believes that 50 per cent. of fetal deaths are preventable. All syphilitic deaths are preventable; about thirty of every fifty deaths from labor complications are preventable, so are also at least half of those due to toxemia of pregnancy. About 20 per cent. of the 50 per cent. preventable deaths could be saved by antenatal measures alone: better midwifery is also an essential requirement.

The Rights of the Child. The rights of the child are named by J. A. Hayne[4] in the order of their sequence, and of their importance, as follows:

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(4) Jour. Amer. Med. Ass'n., July 17, 1920.

The right to be conceived: Strange as it may seem this right has been more successfully denied to the child than perhaps any other of its rights. Malthus wrote and taught that in order for a country to be prosperous, the number of babies must be in ratio to the amount of food produced. This, of course, implied birth regulation. Napoleon, on the other hand, when asked by Madame de Stael who was the greatest living woman of France, replied, to her chagrin: ''Madame, she who has borne the most sons for France.'' Here we have the opposite poles of thought. In this country we have not lacked apostles for both creeds. Roosevelt's slogan was more babies and better babies, and he fought the then growing tendency of the American family under modern conditions to consist of a human parasite, called a wife, and an idolized poodle dog. To the transcendentalist who believes that all souls are drawn from the Over Soul, and enter the material body but to perfect themselves by the trials and tribulations of this world and, after blind effort to reach the light, finally return to the Over Soul perfected by these struggles for higher things, the denial of the right to be conceived and born is to deny the whole scheme of the universe, is a sin against Nature, and therefore unpardonable.

The right to be born after conception: Few will be found who advocate openly the converse of this proposition. But our birth registry and the enormous number of miscarriages and abortions which occur will show that, in practice, many, far too many, deny the child this right. Medical men must be ever on the watch to prevent and expose these violations of the laws of God and man.

The right that its parents shall be healthy, both mentally and physically, in order that the child shall not enter the race of life handicapped by transmitted disease or mental weakness: The problem of eugenics as first advocated by Galton in 1884, has had many followers. In 1904 Galton endowed a chair in the University of London for the purpose of the study of agencies under social control that may improve or impair racial qualities of future generations either physically or mentally. Galton's work has been elaborated, and laws have been passed in many states in the endeavor to safeguard the child in this right.

By law in many states certificates of physical fitness for marriage have been required of both contracting parties. While we concede that this is a step in the right direction, much study is yet necessary before we pass arbitrary laws; for a physically perfect man and woman may never produce a Shakespeare, a Raphael or a Beethoven, and some of the greatest additions to human knowledge and happiness have come from those whose earthly shell was misshapen, for the body must always be regarded as the stringed instrument on which the soul plays wondrous chords, and this would be a dreary world, indeed, without poetry, music and art.

The right that its mother shall be so cared for by the state that neither through poverty nor ignorance shall she bring it into the world in unhygienic surroundings, nor under superintendence of those who are not properly trained to give the most skilful treatment to the mother in this her time of supreme helplessness and agony: This means that maternity hospitals must be maintained in the city, and that in the rural districts trained medical men and skilled nurses must be easily available.

The right to have its own mother's milk until it is old enough to be weaned: This is, perhaps, the most important right, and the one most frequently denied. In the rich it is denied because some complaisant boudoir physician agrees with the mother who desires to be rid of the burden of nursing that her milk does not suit the child, that she does not give sufficient quantity, that it will injure her figure, that it is best for the child not to nurse, and that it disfigures the tender mouth of the child and makes it misshapen.

In the poor it is denied because grinding poverty prevents the mother from giving the time necessary for nursing her little ones. The state should provide that no mother should have to labor so hard that she is unable to nurse her baby. Pensions for mothers are given in England before and after the birth of the child, and there is no expenditure of money a state can make that will pay better dividends than the care of the mother and babe.

Old Jacobi, that Nestor of medical men, said after years of experience that a woman who could have a baby could in 90 per cent. of the cases nurse it. But Nature takes her revenge. In the rich she makes the mother strive by seeking new pleasures every day and excitement of all varieties, to forget the pressure on her breast of little hands, and the dewy mouth of the babe which she has robbed of its birth right. In the poor, the mother, instead of having an infant every two years, has one every year, for normal conception does not take place before the child is weaned, and the poor do not understand all the arts of preventing conception known to the rich.

The right guaranteed by the state, that every baby born shall have an equal chance with other babies to develop into the normal, healthy child: This is the problem of the health officer, that the child shall not have to suffer from the ill effects of communicable diseases; that measles, whooping cough and diphtheria shall no longer be called children's diseases, that the tender babe shall be cared for by all the power of the state as it lives its happy life and grows in wisdom and stature. This also includes medical inspection and correction of defects.

The right that, when it reaches school age, it shall have the best that the resources of any government can command: It should have properly ventilated schools, carefully lighted and heated, with the most approved methods of sanitation; and if a proper diet can not be provided in the homes of the poor, such diet should be provided in the schoolroom, so that the child's budding mind may be trained, that it may attain to industrious, sober and healthy citizenship and take its place in the ranks of producers and be a real asset to the government which has cared for it.

The Effort Syndrome in Children. It is observed by C. G. Kerley(5) that children divide themselves into groups as relates to their individual characteristics. This tendency to grouping is not discernible to any extent among infants. After the second year, individual traits, and a distinct personality manifest themselves. At about this period the child begins to individuate.

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(5) Archiv. Pediatrics, August, 1920.

Coöperation of Physicians in the Health Work of Schools. I. A. Abt[6] is of the opinion that a great deal of the medical examination in the schools is perfunctory, and in order that the real purpose of medical school inspection and examination be accomplished a greater number of full-time men should be employed. Supervisors should be employed who understand not only the diseases peculiar to children in general, but the diseases of school children in particular; and in addition they should be well grounded in the principles of general hygiene and school hygiene. In order that school inspection should yield the very best health results, the physicians and nurses engaged in this work should receive special instruction. They should have frequent conferences, and they should formulate their knowledge and experience so as to standardize the methods of examination. They could thus establish such a high tone for the office of medical inspector that the position would become desirable.

It is important that the best-equipped men in a community should seek these positions. An enthusiastic interest in the work, a desire to be helpful in obtaining results, a well-equipped and fundamental knowledge in all that pertains to disease and its prevention, are the important and fundamental factors in medical school inspection.

After all, however, medical school inspection forms only a small part of the physician's activities. In his larger and broader activities, in his visits in the home and the hospital, possibilities present themselves for promulgating knowledge about child and school hygiene which are too frequently neglected. After all, the health of the child depends as much, if not more, on the hygiene of the home than it does upon the hygiene in the school. It is not enough that the physician should make a diagnosis or prescribe for the individual child or perform a skilful operation. It is quite as important that he should teach and disseminate health knowledge. In

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(6) Proc. Nat'l Education Ass'n., vol. 57, 1919.

the poorer districts of our cities, in the tenements and in the shacks, the most ordinary rules of hygiene are disregarded. Uncleanliness and foul, contaminated air are the rule, and under such conditions good health is the exception. When the physician or the trained hygienist visits such a home it should not be simply a question of a perfunctory medical visit consisting of a hurried physical examination and directions for treatment of the ailment. Kindly suggestions should be offered as to how hygienic conditions may be improved. The suggestions may consist of advice regarding better ventilation, better or cleaner food, or possibly a change of residence. If the physician is thoroughly interested he may follow his visit by sending a district nurse, a social worker, or, in extreme cases, an officer of the health department to remedy the evils.

Bodily Mechanics and Nutrition. L. T. Brown[7] calls attention to the faulty posture or, as he calls it, the faulty mechanics of children and its relation to nutrition. Realizing the differences of opinion and the difficulties of judging good or bad human mechanics, over 700 so-called normal men between the ages of 16 and 22 were examined by Brown and tracings were taken of each one. These tracings were compared and divided into four groups according to the variations which were found. An examination and comparison of these four groups showed certain points of difference which were perfectly constant (Fig. 1).

In Group A, or Good Mechanical Use of the Human Body, (1) the head is straight above the chest, hips and feet; (2) the chest is up and forward; (3) abdomen is in or flat; (4) back—usual curves are not exaggerated.

In Group B, or Fairly Good Mechanical Use of the Body, (1) Head is too far forward; (2) chest not so well up or forward; (3) abdomen shows very little change; (4) back shows very little change.

In Group C, or Bad Mechanical Use of the Body, the changes are more marked: (1) Head is forward of the chest; (2) chest is flat; (3) abdomen is relaxed and forward of the chest; (4) back curves are exaggerated.

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(7) Boston Med. and Surg. Jour., Feb. 19, 1920.

In Group D, or, Very Bad Mechanical Use of the Body, these four points are exaggerated to the extreme.

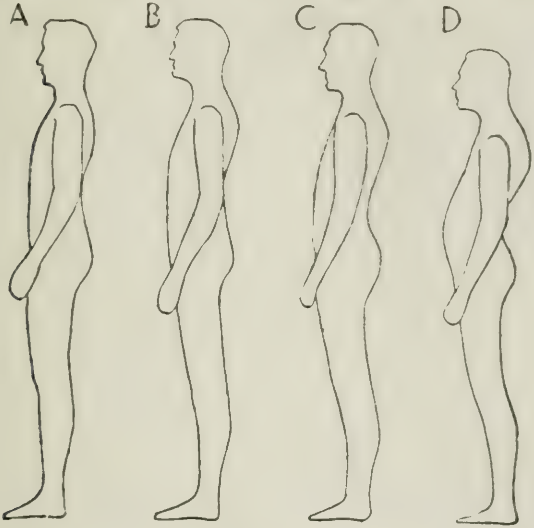

Fig. 1.

Group A 7.5%

Good Mechanical Use of the Human Body.

1. Head straight above chest, hips, and feet.
2. Chest up and forward.
3. Abdomen in or flat.
4. Back usual curves not exaggerated.

Group B 12.5%

Fairly Good Mechanical Use of the Human Body. Note changes from Group A.

1. Head too far forward.
2. Chest not so well up or forward.
3. Abdomen very little change.
4. Back very little change.

Group C 55%

Bad Mechanical Use of the Body. Note changes from Group A.

1. Head forward of chest.
2. Chest flat.
3. Abdomen relaxed and forward.
4. Back curves are exaggerated.

Group D 25%

Very Bad Mechanical Use of the Body. Note changes from Group A.

1. Head still farther forward.
2. Chest still flatter and farther back.
3. Abdomen completely relaxed, "slouchy."
4. Back all curves exaggerated to the extreme.

If one considers as the normal that condition which is found in the average of a large group of cases, and if we believe that this average is the correct or best condition, then one is led to think that the C position is the normal or best one, as 55 per cent. of the men were of this group. The D group is next, as 25 per cent. are such. The B group, third, as 12.5 per cent., and the A group the worst at 7.5 per cent.

In order to ascertain which group gave a story of more trouble or sickness, the past histories of the men were taken into consideration. Results showed that the operation for appendicitis had been done one and one-half times as often in the C and D groups as in the A and B groups; two and one-half times as many men had been operated on two or more times in the C and D as in the A and B groups. In the C and D groups three times as many showed albuminuria as in the A and B groups. Seven times as many in the C and D groups as in the A and B had headaches. No man in the A and B groups complained of backache. The fact also that some of the men overseas fell down and were unable to stand the strain seems to point out that the C and D groups, although they were the average, were not the normal, *i. e.*, as near the perfect as possible (Fig. 2).

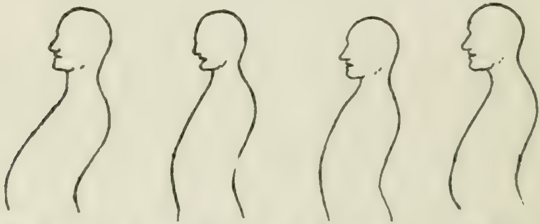

Fig. 2. Tracing of men in the A. E. F. who were not able to stand up to the regular work and were sent to a "Special Training Battalion."

Often general attention to diet, bowel regulation, tonsil removal and correction of faulty vision may correct the condition. However, when these fail to bring results an application of the principles of bodily mechanics may be of great assistance to the physician.

The entire treatment from this viewpoint is based on the idea of giving as much rest as possible to all parts of the body and especially to the thoracic and abdominal viscera. It is, of course, important that this should be accomplished without keeping the child in bed or forcing it to lie down much of the time.

It is advisable when we prescribe rest periods to begin these periods by putting the children in a position that will make them not only breathe more correctly, but which will put their bodies into as nearly perfect a mechanical position as possible. Such a position is accomplished by placing the child on a firm bed or couch and putting a pillow under the back, so that the ribs are forced into a fully expanded position. Such a position, after a time, becomes very restful. Lying on the face with a pillow under the lower abdomen and hips is another very good position for getting concentrated rest.

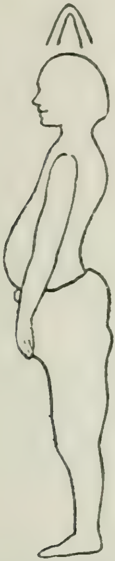

Fig. 3. Typical example of the mal-nourished child. The lines above the head are tracings of the costal angle taken in the natural standing position and in full expansion of the chest.

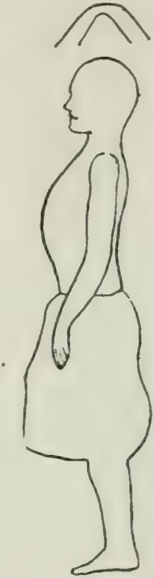

Fig. 4. Same child as Fig. 3 after three months' educational work. The lines above the head are the rib angles.

How can this rest be accomplished when the child is up and around? It is here we come up against the much debated question of exercises and braces. It is very important that the child's daily routine be regulated to his physical endurance. An attempt should be made to educate and train the child to use its body in better bodily mechanics. The educational exercises and the support, to be of value, should keep the child from getting into a position of extreme fatigue and from getting over-tired (Figs. 3 and 4).

From the point of view of bodily mechanics, the first essential point of any educational exercise should be to teach the child how to use its body correctly. The child should be trained to do the ordinary daily tasks with the body in good alignment all the time. The idea that throwing the shoulders back is the way to get the correct position should be discountenanced, as it is entirely erroneous and leads to a much exaggerated position. If the general training does not correct the child's position then a support that will be pliable and will not limit the spinal motions, should be applied.

The author says that his examination of adults showed very definitely the need of training that should begin with young children.

Bodily Mechanics. F. B. Talbot and L. T. Brown[8] believe that faulty bodily mechanics was responsible for a great loss of efficiency among adults in the war, and that correcting it, changed many inefficient men into efficient soldiers. The condition is common to all ages and is surprisingly prevalent.

It is easily corrected and can be done so most economically during childhood. It is responsible in most instances for diminished powers of digesting fat in children, and is the cause of a certain amount of chronic constipation.

It is the background and probably the cause of many if not most cases of recurrent vomiting. In many instances the symptoms of acute abdominal pain in children, when associated with chronic constipation, are due to poor bodily mechanics. These symptoms are often so severe that they are confused with those of acute intestinal obstruction due to other causes.

In the cases cited by the authors in which the faulty

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(8) Amer. Jour. Dis. Child., September, 1920.

body mechanics have been corrected, in connection with the other treatment, the patients have all shown a more speedy recovery than is seen in cases without this correction. This makes the authors feel that the element of body mechanics is one which should always be considered in cases of this type.

Clothing of Infants in Summer and Winter. Observations were made by L. W. Sauer[9] on the clothing of 400 children varying in age from 1 week to 2 years; 200 were observed in the hot days of summer, and 200 in the cold days of winter. Only the regular clothing worn indoors was weighed. These were not hospital or dispensary cases.

It was found that in infants up to 3 or 4 months the weight of the clothing worn in summer and winter was about the same. In infants from 3 to 10 months old there was a difference of about one-seventh in the weight of summer and winter clothing. In the older children, the difference was about one-fifth on the average.

The only figures which the author finds available giving data for a comparison of the weight of clothing to the body weight of infants are those of Griffith. The figures obtained from the author's observations differ considerably from those of Griffith, but it is possible that the high figures given by Griffith are due to the fact that his babies were generally in a poor state of nutrition.

In the absence of standards, it is impossible to say whether the amount of clothing for summer and winter is proper.

The author thinks it desirable that some standards based on experimentations should be established as to rational clothing for infants, including fabrics and materials.

[The hygiene and heating of homes has been modified very greatly in the last twenty-five years. In the winter the average house or apartment in the American city is excessively warm. The baby sleeps out of doors or on the porch during the daytime. At night the windows are widely opened. The remainder of the day he spends indoors in an overheated apartment. As a result

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(9) Amer. Jour. Dis. Child., July, 1919.

of the modification of the heating of the home and the fresh air habit, a child is frequently overclothed while indoors and insufficiently clothed while out of doors. The clothing of infants should be changed in such a way as to meet the new conditions.—Ed.]

Reconstruction of the Sick Child. A. Levinson[1] calls attention to the importance of convalescence in pediatrics. He states that the length of convalescence is necessarily arbitrary depending on the nature of the disease, the amount of damage produced by it, and the amount of resistance the patient has left after the disease. Convalescence may take one week, or one year, and may take the rest of the individual's life. Some children recover from measles in a week; others do not recover for the rest of their life.

In order to understand the finer points of convalescense, one must understand the so-called pathologic physiology of both disease and convalescence. There is no disease of any account that does not leave its imprint on the more important organs of the body. If there is no actual inflammation or degeneration of the organs, there is at least a lowered resistance of the organs and a change in their physiology. Especially in children do the organs impaired by disease lose a certain amount of their power to perform the normal amount of work consistent with the natural state of the body.

One can not, of course, lay down any hard and fast rules as to the treatment of convalescence; this must necessarily vary with the disease and with the patient. However, the author emphasizes the beneficial effects of sunshine, air, rest, substantial food and constructive play.

[There is no more important element in the management of convalescent children than an adequate, well-balanced food supply.—Ed.]

Dietetics in Adolescence. Two main questions are discussed by C. Dukes:[2]

1. What is the sound, wholesome plain food most suitable for adolescence?
2. What constitutes plenty for adolescence?

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(1) Modern Medicine, May, 1920.
(2) Practitioner, July, 1919.

The type of diet during adolescence is embodied in two fundamental rules; (*a*) a larger quantity of all the essential kinds of food is then demanded than at any other time of life; (*b*) a relative excess of proteins is indispensable if the highest state of growth and development is to be attained.

Adolescents need more food and dispose of it more quickly than adults. Hence there should be proper distribution of the time of meals depending on the quantity of food ingested or offered at a meal. If there is too long an interval after a light meal in an adolescent there will be a "starvation period" during which, nevertheless, growth must go on.

Foods recommended for adolescents are: Bread, whole meal oatmeal, sugar (3 oz. daily); milk; meat once a day is sufficient in this period especially for girls. Fat is absolutely necessary to adolescents; fish, not too often; green vegetables in abundance, fruit, puddings of all kinds; cheese at midday only.

The chief cause of indigestion in healthy adolescence is not over-eating or even bolting the food, but arises from drinking too much, and too strong tea and coffee.

The author says that the daily amount of water needed by the system is 4½ pints.

Treatment of Malnutrition Among Children at Mt. Sinai Dispensary, New York City. The Social Service Department of Mt. Sinai Hospital undertook some interesting comparisons of the different methods of improving the conditions of under-nourished children. The survey which was made in 1918 is reported by M. H. Bass.[3]

A large number of children drawn from all departments including cardiac and tuberculosis clinics, were given a quart of milk daily and in some cases, eggs were also provided. After receiving this extra nourishment for four months, the average gain of each child was 4½ lbs.

An attempt was made to ascertain the best available means of giving social aid to under-nourished children. It was decided to compare the results to be obtained from (1) a short stay in the country (two weeks); (2)

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(3) Hospital Social Service Quarterly, 1919. 1, 195.

a prolonged stay in a well-regulated fresh air center in the city (nine weeks on the roof of the Young Woman's Hebrew Association building); and (3) providing food at home for a period of one month.

All the children's clinics of the dispensary were asked to send their malnutrition cases. Only children between 6 and 12 years were chosen. They were examined physically and notes were taken as to age, weight, height, heart, lungs, tonsils, adenoids, teeth, skin, hemoglobin percentage and von Pirquet test. Any glaring physical defects were remedied. No manifestly tuberculous or cardiac cases were accepted.

The author desired to obtain data on forty children in each of the three groups, and to obtain these it was necessary to examine about 200 children. No child was included in the experiment unless the family's circumstances showed that aid was desirable.

The children sent to the country showed the greatest improvement. Average gain in weight upon return from country was 2.6 lbs.; at the end of four months 3.9 lbs.

The children sent to the Y. W. H. A. roof showed an average gain at the end of their attendance on roof 2 lbs. and at the end of four months 3.2 lbs.

The children to whom food was sent in their homes showed an average gain of 6.5 lbs. at the end of the extra rations; at the end of four months 1.6 lbs.

An increase of at least 10 per cent. in hemoglobin was shown in seven of country group, thirteen of roof group, fifteen of home care group.

The author recommends, therefore, that all undernourished children be sent away from the city for a vacation if possible, and that those children for whom it is impossible to procure accommodations in the country be sent to some fresh air center in the city in preference to attempting to improve nutrition by supplying extra food at home.

NUTRITIONAL DISTURBANCES.

Nutritional Disturbance with Fat-Rich Breast Milk. E. Slawik[4] discusses at length the importance of chem-

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(4) Deutsch. med. Wochenschr., Jan. 30, 1919.

ical examination of breast milk. He mentions the fact that the fat contents of milk are subject to considerable fluctuations. The fat is much greater in colostrum than in regular milk, and lower in the first portion than in the last. The fat contents also fluctuate during different times of the day.

Gregor studied these fluctuations and found great differences even in the same wet-nurse. The examinations of Reiher, however, did not show such wide fluctuations in the same individuals. Moll, like Reiher, noticed different fat contents only within certain limits.

The author states that the chemical analysis of human milk has been too much neglected and that too little attention is being paid to the causes of the disturbance of nutrition. We are too prone, he thinks, to place the blame for poor progress in a nursing infant, on the child rather than on the character of the milk and its peculiarities.

Different text-books discuss this question but very briefly, as they are of the opinion that disturbances of nutrition attributed to an abnormal condition of human milk belong to the category of superstitions. Only in Pfaundler and Schlossman does one find reference to the subject of disturbed nutrition through faulty assimilation of a special human milk. Here Fischel points out that in the most frequent cases, in which microscopic or chemical milk constituents are shown to be the cause of illness, it is found that a milk of an abnormally high fat content exceeding ordinary normal fluctuations is the real cause.

Gregor, in his studies upon the fluctuations of fat contents in human milk, has observed that dyspeptic changes in the stool often go hand in hand with these fluctuations, and that the infant needs smaller amounts of fat-rich milk than of milk poor in fat. Gregor, however, did not come to any conclusion as to the relation between the thriving of the infant and the fatty substance of the milk.

Benedix and Gregor ascribe the appearance of dyspepsia during menstruation to the higher fat content of breast milk during this time. Concerning fat-poor milk, Epstein made special mention in 1900 of the relation between the fat content and nutritional disturbances. He said that he obtained improvement of poorly-thriving nurslings by a proper diet of the mothers that resulted in an increase in the fat-content of the milk. Moll, in Epstein's clinic, made further study of this question. His first attempt was with one child who did not thrive and who had dyspeptic stools due to fat-poor milk. By feeding the mother bacon, the fat content of the mother's milk was brought to normal, and the child began to thrive. In two other children, one of whom showed illness because of a fat-poor milk, and the other because of a fat-rich milk, the same favorable results were brought about by a change of the respective wet nurses. This attempt, as Moll himself admits, is not so certain, for the condition of the infant after change of wet nurse may also be affected by causes other than the chemical peculiarity of the milk. However, the dependence of the favorable results on the fat content of the milk is in these two cases too striking to be ascribed simply as the result of the change of wet nurses.

The author deplores the fact that in the majority of text-books the supposition is that the milk of one woman is the same as that of another and that possible fluctuations are not of importance. He made numerous fat analyses that led him to the conclusion that there are women who constantly have milk that is far from normal, and that fluctuates considerably, causing chronic disturbances in the child's nutrition.

Slawik used the following method for fat analysis:

Equal quantities of milk were drawn from both breasts before and after nursing, and each portion, either separately or mixed was examined with the Gerber butyrometer. The milk was drawn in the afternoon. Several examinations were always made on the same sample.

From a series of examinations made, the author concludes that nutritional disturbances due to faulty fat contents of human milk show the following:

Non-increase of weight, or slow decrease: The cause of the poor progress in all cases is the frequent, early continuous vomiting. The children vomit after almost every nursing. The cases can not be explained on the ground of over-feeding, pylorospasm or nervous influences.

Striking and also very characteristic in these cases is the disinclination to nurse, even though the mothers have plenty of milk and well-formed breasts. The infants obtain considerably less quantity of milk than they need.

The disturbed general condition is shown in the increasing paleness, weakness and lethargy. The stool for the most part is homogeneous, lardy and odorless, later becoming typically rancid smelling and light.

Frequently there exists an obstinate constipation. As a rule the nutritional disturbance begins with non-increase or slight decrease in weight, vomiting, and dislike to nurse.

It takes some time for the illness to develop, so that we can recognize, by the peculiarity of the stool and the general condition of the infant, that it is a case of insufficient fat digestion.

These nutritional disturbances differ from those, which usually are classed under the name of faulty fat digestion in so far that in the latter there is a normal fat content of the milk and a primary functional disturbance of the gastro-intestinal tract in the sense of insufficient fat assimilation; whereas in the former the primary cause lies in the high fat content of the mother's milk.

It is, therefore, a question of over-nourishment with human milk fat and its damaging influences not alone upon the gastro-intestinal tract, but also on intermediary assimilation.

The faulty composition of mother's milk in cases discussed by the author gave rise to nutritional disturbances analogous to those of cow's milk. In over-feeding with cow's milk the formation of abnormal amounts of fat acids takes place, which withdraws considerable quantities of alkalies from the neutralization of the organism. These alkalies are lost to the organism. For the growth and thriving of the nursling the retention of alkalies is just as important as nitrogen, phosphorous and other mineral compositions of the food. If these alkalies are lacking the whole assimilation suffers, finding expression in the continued disturbance and poor advancement of the infant and in a developing atrophy.

Concerning the dietary treatment in these nutritional disturbances, the feeding of a fat-poor food will bring improvement and recovery.

Abnormally high fat content of human milk is, therefore, worthy of special observation as a cause in the nutritional disturbance of the nursling. To diagnose nutritional disturbance as such, because of an abnormal chemically composed milk—a lengthy and thorough examination of mother and infant is necessary, so that all other possible causes may be excluded.

In any case, one should never neglect to examine the mother's milk and its fat content in all chronic gastrointestinal disturbances of nurslings with uncertain etiology.

[In recent years the general experience of clinicians has led them to be skeptical as to the results obtained from chemical examination of breast milk. It was frequently found that many babies thrive well where analysis showed the breast milk to be poor, and conversely do badly where the analysis shows a good milk. —Ed.]

The Dietetic Treatment of Summer Diarrhea. J. P. C. Griffith[5] points out that diet is by far the most important factor in treatment of this condition. The first and most vital step in this direction is the immediate and complete withdrawal of food at the beginning of the attack. Combined with the withdrawal of food should be the removal of any food already in the intestinal canal. This is to be accomplished by the prompt administration of a purgative, such as castor oil for young infants, and magnesia in some form for older ones or for children, since castor oil is very liable to be rejected by them. If vomiting attends the diarrhea at the beginning, it may be necessary to wait before a purgative can be safely administered. In any case, a large intestinal douche may be given with advantage.

How long the initial starvation shall continue depends on the case. Breast-fed infants may well have the breast withheld for twenty-four hours, and those

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(5) Archiv. Pediatrics, August, 1920.

bottle-fed require usually a longer time. Water, of course, should be administered freely, and it will relieve the mother's mind if barley water be used instead of simple water. While fever continues, showing that an infection is still present, return to a milk food should be delayed, and the resumption of it finally be made very carefully, giving small amounts diluted, and preferably skimmed, the original strength of the mixture being only very gradually resumed. Broths, thickened with an amylaceous substance, or even thicker unirritating porridges, are extremely serviceable when the time for food has come but while one still fears the action of milk.

When cases have proved tedious and obstinate, it is often best to abandon efforts to return to the former milk mixture, and to make a complete change in the diet, using whey, casein milk, buttermilk, or the like. Sometimes the thick gruels, to which reference has been made, are of great value as a food; bearing in mind, however, the occasional danger of producing a starch edema when no protein or an insufficient amount of it is given. In some cases nothing will be of service but the administration of human milk.

Fat Metabolism in Health and Disease with Special Reference to Infancy and Childhood. A series of observations were made by H. S. Hutchison[6] on the digestion and absorption of fats in cases of marasmus or infantile atrophy. The conclusions reached are as follows:

The digestion of fats in infantile atrophy, rickets, and tetany is carried out as efficiently as in healthy children.

The fat output in the feces varies directly with the fecal weight and forms approximately one-third of this.

In order to determine, in any balance experiment, whether the percentage absorption is normal or not, it is necessary to take into consideration the fecal weight. When the fat intake is under 20 gm. daily, both fat intake and fecal weight will affect the percentage absorption though the fecal weight will be the predominant factor, and, when the intake is over 20 gm. a day, the intake may, for practical purposes, be neglected, and the percentage absorption will depend on the fecal weight.

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(6) Quart. Jour. Med., April, 1920.

When the fecal weight is taken into consideration, the observed and calculated percentage absorptions agree closely. The lower average percentage absorption in atrophy is due to the lower average fat intake, this being only 17.8 gm. as compared with 35.2 gm. in healthy children.

There is a slightly greater loss of fat in infantile atrophy, due to the motions being larger than in healthy children, but the excessive loss, which amounts to 0.88 gm. daily, can be neglected so far as nutrition is concerned. There is no true deficient absorption.

In rickets, the excess loss of fat daily over that in healthy children averages 0.6 gm., an amount which is quite sufficient to affect nutrition.

In tetany, the excess loss is 2.4 gm. daily. This is due chiefly to the passage of larger motions than normal, *viz.:* 14.4 gm. compared with 9.9 gm., and to a less extent to a true deficient absorption, since the fat in the feces averages 38.0 per cent. This loss is insufficient to affect nutrition.

Other facts point to a normal fat absorption in atrophy, *viz.:* the increased amount of fat absorbed with an increased intake, and the fact that improvement frequently follows the lowering of the fat content of the milk.

Saponification of fats in the intestine does not affect the absorption of fats.

The fairly constant percentage of fat in the feces of man and other animals suggests that fecal fat has a function to perform, and that it is not a pure excretion. There is no evidence, however, to indicate what this function is.

Nutritional Disorders of Children Associated with a Putrefactive Intestinal Flora. After a study of the clinical and bacteriologic phases of nutritional disorders, L. Porter, G. B. Morris, and K. F. Meyer,[1] believe they are able to show the following:

Children whose diet is well-balanced and whose nutrition is normal have an intestinal flora consisting of fermentative and putrefactive types without preponderance of either.

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(1) Amer. Jour. Dis. Child., October, 1919.

Children fed on large quantities of cow's milk have a more complex flora made up of various types, most of which are facultative putrefactors.

In children who suffer from certain of the types of alimentary intoxication with malnutrition, the intestinal flora departs in a uniform manner from the normal; this departure is always characterized by the establishment of bacterial types predominantly putrefactive.

The return of these children to normal health is coincident with a regression of the intestinal flora toward predominantly fermentative types and a later swing to balance between the two types.

Such changes in the intestinal flora can be brought about in the intestine of the human infant by withdrawing animal protein and persistently feeding large amounts of lactose (from 2 to 4 ounces daily) and other carbohydrates; the period which may be necessary to produce this variation is from ten to forty days. While feeding acidophilus cultures has in a few cases aided a more rapid establishment of aciduric flora in the baby's intestine, this influence was not very great.

The progressive cessation of the symptoms of intoxication and a return of toxemic patients to nutritional health coincides with the recognizable dominance of a fermentative flora.

Lactose and dextrines are the carbohydrates most effective in encouraging the rapid establishment of a fermentative flora in the intestines of infants and children.

Dextrose Tolerance in Atrophic Infants. The glucose tolerance of normal and of atrophic infants was determined by P. M. Mattill, K. M. Mayer and L. W. Sauer.[2] The authors found that the glucose tolerance of the approximately normal infant, as determined by the Woodyatt method, is very likely identical with that of the normal adult which is 0.8 to 0.9 gm. per kilogram per hour.

The tolerance of atrophic infants for glucose is considerably greater; it varied in the authors' cases from 1.4 or 1.5 gm. to 1.8 gm. per kilogram per hour.

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(2) Amer. Jour. Dis. Child., January, 1920.

The Artificial Feeding of Athreptic Infants. It was found by W. McKim Marriott,[3] that in athrepsia or marasmus of infants, the volume flow of the blood, that is to say, the amount of blood flowing through a given portion of the body per minute, is diminished. This diminished volume flow is dependent, in part at least, on a decreased blood volume, seemingly the result of a decreased protein content of the plasma and consequent inability of the blood to maintain its water content. There is an atrophy of the blood as well as of the rest of the body.

The obvious remedy for the condition is food, and very considerable amounts of food, for the energy requirement of such infants is high, and there is the need for replacing much lost tissue. Many of these infants will not begin to gain until they have received as much as 150 or 200 calories per kilogram of body weight, but unfortunately the tolerance for food is low. The intestinal tract and digestive glands supplied by an atrophied, poorly circulating blood are functionally weak. Digestion and absorption of food are necessarily poor.

In selecting a food for athreptic infants, the author determined on a lactic acid milk as a basis. There would seem to be no very good reason *a priori*, says the author, why the fat or, at any rate, all of the fat, should be removed from lactic-acid milk. Surely the 2.5 per cent. of fat in protein milk is perfectly well tolerated. Buttermilk is ordinarily fed undiluted to even young infants with fairly good results, thus demonstrating that the concentration of sugar, protein and whey constituents contained in whole milk is not in itself harmful. A certain amount of fat can be tolerated by almost any infant, especially in a lactic-acid-milk mixture. On this assumption the author has fed undiluted lactic-acid milk containing amounts of fat up to the amount contained in whole milk, and has been convinced that the great majority of weak, athreptic infants tolerate extremely well undiluted, whole lactic-acid milk in fairly large amounts, one-fifth of the body weight or more daily. To infants under 2 months of age, he usually fed the lactic-

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(3) Jour. Amer. Med. Assn., Oct. 18, 1919.

acid milk somewhat diluted, but the evidence is not conclusive that such dilution is essential.

Having demonstrated that whole lactic acid milk is well tolerated, he cautiously tried the addition of carbohydrate to the lactic-acid milk in order further to increase the caloric value.

He added carbohydrate in the form of commercial corn syrup to the whole lactic-acid milk fed to athreptic infants, and the results were good. There was little or no tendency to diarrhea even when as much as 10 per cent. of carbohydrate was added. The stools remained firm, formed, and pasty, averaging from one to three a day. In the case of some infants there seemed to be almost no limit to the amount of carbohydrate that could be added to such a milk mixture.

The method of preparation of lactic-acid milk and corn-syrup mixtures is as follows:

Whole milk is sterilized by boiling, cooled to room temperature, inoculated with a culture of Bulgarian bacillus or other lactic-acid producing organisms, and incubated over night. A properly prepared whole lactic-acid milk is thick, creamy and homogeneous. Too long a period of incubation or too high a temperature results in the separation of curds and whey.

The corn syrup used has been an ordinary commercial variety. Such a syrup contains from 80 to 85 per cent. of carbohydrate by weight or, as its specific gravity is high (approximately 1.40), it contains from 110 to 120 per cent. of carbohydrate by volume. The thick syrup is somewhat difficult to handle and to mix with milk. It is more convenient to prepare a diluted syrup. Mixing 45 volumes of the thick syrup with 55 volumes of water gives a thin syrup containing 50 gm. of carbohydrate. Such a thin syrup is measured in a graduate and added to the whole lactic-acid milk. The mixture should not be agitated sufficiently to separate the fat as butter. The mixture is not further sterilized, but is kept in a refrigerator until used. As such mixtures are very thick, a nipple with a large hole must be used in feeding.

In feeding formulas of the type described, the author advises beginning with a mixture of equal parts of whole lactic-acid milk and buttermilk (fat-free lactic-acid milk) or, in the case of infants convalescing from diarrhea, on buttermilk alone. If such a mixture is well tolerated, the proportion of whole lactic-acid milk in the mixture is increased until straight whole lactic-acid milk is fed in most instances. The addition of the syrup is then begun, 3 per cent. of sugar being added at first; if no diarrhea occurs, the sugar percentage is gradually increased, depending on the infant's tolerance and on the amount of food necessary to cause a gain in weight. Fairly large amounts of the corn syrup can often be given to advantage.

The author fed the enriched whole lactic-acid milk mixture to forty infants varying in age from 1½ months to 18 months, the majority being between 2 and 5 months of age, at the time the feeding was begun. The period of time over which different infants received the formula varied from four days to eight weeks.

All the infants were under-nourished—the majority markedly so. About half of those observed had recently suffered from diarrhea; four were syphilitic; fifteen suffered from other infections during the period they were on the formula. The infections included pyelitis, otitis media, pertussis and bronchopneumonia.

Little difficulty was experienced in making the infants take the food. Some older infants refused the food at first, but later took it eagerly. There were mechanical difficulties in feeding two infants with cleft palates. They did not at first seem able to swallow well the very thick mixture; later they took it without difficulty.

The amount of carbohydrate added to whole lactic-acid milk varied up to 10 per cent. or over, the total sugar content ran up to as high as 15 per cent. The total added carbohydrate has been as high as 3 ounces a day.

Vomiting, other than the spitting up of very small amounts immediately after a feeding, was unusual and in almost every instance it could be accounted for by the onset of an acute infection.

The characteristic stools of the infants fed on the mixture described were light brown, formed and pasty when mashed with the spatula.

A gain in weight of the infants fed on whole lactic-acid milk mixtures began when a sufficient caloric intake was reached, and generally continued steadily for days and weeks, interrupted only by acute infections. Some infants continued to gain even through febrile periods. The number of calories required before an infant would gain weight consistently was often high. Few infants whose weight was as low as 50 per cent. of the normal weight for the age gained on less than 160 calories per kilogram, and many required 200 calories or more. The gain in weight of these infants was not due to a process of "water logging." The gain continued over too long a period and the flesh was firm and elastic.

Rôle of Fat in the Etiology of Infantile Marasmus. H. S. Hutchison[4] claims that there is no evidence to show that in infantile marasmus a defective absorption of fat is a factor in its causation either through imperfect digestion, passage of unduly large motions, or through a defect in the absorptive capacity of the bowel wall.

Saponification of fats does not lead to a loss of fat through defective absorption. A high percentage of insoluble soaps in the feces fat simply upsets the soap-fatty acid balance, and since the insoluble soaps possess feeble hydrophilic properties, constipation results.

The iodine value of the feces fat is lower than in health, and this suggests that in marasmus there may be a qualitative error in absorption rather than a quantitative one.

The alkaline reserve of the blood in marasmus is lower than in health, but the diminution is small, and does not suggest an acidosis of any consequence. There is no evidence that there is a lower alkaline reserve on a whole milk diet than on a weak fat milk, so that apparently in marasmus there is not an incomplete metabolism of fat.

GASTRO-INTESTINAL DISEASES.

Congenital Pyloric Stenosis. A. B. Marfan[5] believes that congenital pyloric stricture that is not treated surgically is usually fatal within one year, although

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(4) Glasgow Med. Jour., November, 1919.
(5) Nourrisson, May, 1919.

there are exceptional cases in which medical treatment gives relief. He calls attention to cases in which the symptoms of pyloric stenosis appear later in life. The early years pass without any symptoms, and it is only in the second, third or perhaps the eleventh or twelfth year that the symptoms appear, being brought out by some gastric lesion.

The differential diagnosis from habitual vomiting is not very easy. The following points, however, are of great help: The periods of relative relief are more marked and last longer in habitual vomiting than in pyloric stenosis. The alternating periods of diarrhea and constipation are marked in habitual vomiting, and the effects of a strict diet and medical treatment are usually beneficial in habitual vomiting. Of great help in diagnosis are the radioscopic findings after a test meal and the passage of carmine in the stools.

Hypertrophic Stenosis of the Pylorus in Infancy. It is pointed out by G. A. Wall,[6] that hypertrophic stenosis in infancy is a pathologic entity and should not be confounded with other pathologic conditions which may be accompanied by some similar symptoms.

In the milder forms the patients often recover with medical treatment. All those who do not improve markedly within one or two weeks should be considered as surgical cases and treated by operation.

The symptoms which indictae surgical interference are rapid loss of weight, persistent and forcible vomiting, and active gastric peristalsis, especially if tumor be present. The sooner the patient comes to operation the more surely will the result be successful.

The author believes that the Rammstedt operation seems now to be the operation of choice and should be done in all cases coming to operation. This conclusion, he believes, would seem to be warranted from the results at the Babies' Hospital, where the same operation, same operators and the same after-treatment has given such brilliant results.

The after-treatment of these cases is of very great importance.

Patients not operated on usually show no symptoms

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(6) Jour. Oklahoma State Med. Ass'n., March, 1920.

after the first year, but there is a possibility that this apparent cure may be the basis of pyloric obstruction which is found in later life.

Congenital Hypertrophic Stenosis of the Pylorus. H. T. Gray and G. R. Pirie[7] believe that congenital pyloric hypertrophy is the result of prolonged antenatal spasm induced by hyper-adrenalism. Pyloric obstruction is completed by two secondary influences: (1) retention gastritis with consequent swelling of the mucosa; (2) added spasm due to several causes, the foremost being phimosis.

The final results in the closure of the pyloric orifice are: (*a*) absence of acid chyme in the first part of the duodenum, leading to (*b*) failure of secretin formation, leading to (*c*) suppression of pancreatic secretion. These factors themselves further induce (*d*) inhibition of the normal pyloric relaxation and establishment of the vicious circle.

The authors believe that no positive diagnosis should be made without the demonstration of a palpable tumor.

Fulminating cases demand immediate operation. In all cases, palliative treatment should first be adopted as follows: (1) peptonized milk in appropriate quantities; (2) gastric lavage; (3) circumcision; (4) subcutaneous infusion of saline and 2 per cent. glucose when necessary; and possibly (5) administration of chloral hydrate.

If there is no relief of symptoms in forty-eight hours, operation should be performed without delay. In the majority of cases palliative treatment should be persevered in for from ten to twelve days. The critical time at which failure or success of palliative treatment can be gauged is from ten to twelve days from the commencement of treatment, and coincides with the re-establishment of pancreatic function in successful cases. Failure to improve after this point constitutes an indication for operation in boys, but not necessarily in girls.

Sex incidence is about equal; phimosis is the determining factor in the onset and severity of symptoms in a large proportion of male subjects of pyloric hypertrophy.

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(7) Lancet, Sept. 20, 1919.

Rammstedt's operation is the operation of choice. Post-operative diet should consist of peptonized milk until pancreatic functions have been re-established.

[Phimosis as an etiologic factor in congenital hypertrophic stenosis of the pylorus will not be considered seriously.—Ed.]

Review of Cases of Congenital Hypertrophic Pyloric Stenosis. A review of 175 cases of pyloric stenosis leads W. A. Downes[8] to the following conclusions:

If a satisfactory history can be obtained, and if the findings of a proper physical examination are correctly interpreted, the diagnosis of congenital hypertrophic pyloric stenosis should be made in practically every case.

If the patient is observed from the onset of symptoms, medical treatment may be tried for a period of not longer than ten days, provided the weight loss does not exceed 20 per cent. during this time. If, at the end of this period, the child does not show definite improvement, operative interference is indicated. Any patient continued under medical care and suffering a relapse should immediately be classed as a surgical case.

The mortality among patients coming to operation within four weeks from the onset of symptoms is less than 8 per cent.

The results following the Fredet-Rammstedt operation are permanent and the cure complete.

Hyperchlorhydria: A Frequent Cause of Defective Appetite in Children. J. H. Kerley[9] believes that hyperchlorhydria is a common cause of defective appetite in children of the runabout age, or older, with the resulting symptoms of variable desire for food, indefinite abdominal pains, flatulency, and acid eructations. In the etiologic relationship dietary indiscretions play an important part.

The treatment consists of giving alkalies to neutralize the excess of acids, of substituting an easily digestible non-irritative diet, and of giving due attention to general hygienic measures.

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(8) Jour. Amer. Med. Ass'n., July 24, 1920.
(9) Med. Record, May 8, 1920.

Intussusception in Infants with a Report of Five Cases. J. W. Epstein[1] says that intussusception, being relatively uncommon, as compared with other gastrointestinal diseases which occur in infancy, is often confused with the more frequent manifestations of such disturbances, especially with follicular enteritis. The acute onset, the symptoms of vomiting, bloody stools, abdominal pains and toxicity, are common to both conditions and one is therefore easily misled to pronounce the diagnosis of follicular enteritis or intestinal intoxication, unless a few differential points are taken into consideration. He cites five cases, all of which came to him from one to four days after the inception of trouble, during which time these infants were treated for summer complaint.

Four of the cases occurred during the summer months when every physician is called to treat children for various gastric disorders. The season of the year and the acute onset resembling that of gastro-intestinal disorders is prone to distract the physician's mind from the possibility of an intussusception. In all the cases, the alarming symptom that induced the mother to seek medical advice was the hemorrhage from the rectum, a symptom of sufficiently grave importance to warrant the elimination of a possible insussusception. The differential diagnosis from a follicular enteritis, the only form of gastroenteritis in which blood is present in the stools, a normal or subnormal temperature, absence of stools, a palpable tumor, and a mass on rectal examination will establish the diagnosis of intussusception with certainty; in follicular enteritis the blood is scarce, just enough to give the mucus a bloody tint, there is no shock, no tumor mass palpable, high fever is present, and the stools on microscopic examination reveal the presence of pus cells.

The author advises that in every case with a history of blood in the stools a rectal examination should be made for the purpose of either establishing or eliminating a diagnosis of intussusception. It would also seem necessary that the napkin should be examined by the physician to determine whether there are stools present

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(1) Ohio State Med. Jour., June, 1920.

with blood or there is pure blood only. The statement of the mother is not always reliable.

Length of the Large and the Small Intestines in Young Children. Observations are reported by L. Robbin[2] on measurements made at necropsy of the large intestine, small intestine and body length in 185 children.

The length of the large intestine was found by the author to be between 80 and 130 per cent. of the length of the body in 91.3 per cent. of 185 bodies of infants examined.

The length of the small intestine was found to be between 500 and 900 per cent. of the length of the body in 79.9 per cent. of all cases.

An unusually long large intestine was not accompanied by an unusually long small intestine; an unusually short large intestine was not accompanied by an unusually short small intestine.

No association of an unusually short or long small intestine with the clinical condition could be established.

No correlation could be established between an unusually short or long large intestine and the clinical condition. The author believes, however, that the anomaly of an unusually long large intestine might be a potential factor in the causation of chronic intestinal indigestion or chronic constipation of later life.

The indications are that during early life the body grows somewhat more rapidly in length than does either the small or large intestine.

The most Common Rectal Diseases in Children. According to H. A. Brav,[3] hemorrhoids are rarely observed in children. The author has treated but three cases; one of these, a boy of 10, was suffering from protruding internal hemorrhoids; the second was a boy, 4 years old, with small venous internal hemorrhoids, the result of obstinate constipation; the third, a girl, 2 years old, had a thrombotic hemorrhoid caused by straining at the act of defecation.

The symptoms of hemorrhoids in children are very similar to those of the same affection in adults, consist-

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(2) Amer. Jour. Dis. Child., May, 1920.

(3) Pennsylvania Med. Jour., September, 1919.

ing in the protrusion of the hemorrhoids and occasional bleeding at the time of defecation.

The treatment of hemorrhoids in children consists in the regulation of the action of the bowels and the application of astringent ointments. Under this treatment a cure will generally result. In aggravated cases the use of the ligature or the clamp and cautery is demanded.

Prolapsus recti frequently occurs in children. It is either congenital, due to weakness of the sphincters, or acquired through pressing or straining in constipation, diarrhea, pertussis, oxyuris, phimosis, vesical calculus, or constant crying. A simple prolapse of mucous membrane very rarely occurs in children; it is invariably found to consist of all the coats of the bowel. A part of the rectum, about 3 inches in length, comes down at stool in the form of a round or sausage-shaped, glistening red, or bluish red, frequently bleeding mass. The protrusion is either spontaneously retracted or is replaced by the mother, but prolapses again at the next act of defecation. The prolapsed part is, as a rule, healthy in appearance, but sometimes becomes ulcerated or excoriated from constant friction against the clothing.

The prognosis is good and the treatment simple. First, reduction should be tried. The prolapsed portion is slowly pushed up into the rectum with the fingers well lubricated with vaseline. After the reduction has been completed a thick compress of absorbent cotton is placed over the anal orifice; the buttocks are for some time held together with a bandage or adhesive plaster. Precautions should be taken to prevent recurrences during defecation or micturition. Children under 3 years of age should not be permitted to defecate into a vessel placed on the floor. The feces should either be voided in the recumbent position or while the child is suspended vertically. This can easily be done by the nurse lifting the child off the ground with the hands in the child's armpits. By this latter method hard straining is avoided and the descent of the bowel prevented. In older children defecation should always be effected in the recumbent position. These procedures will sometimes remedy the trouble, provided etiologic factors are removed.

When prolapse of the rectum depends on the presence of a vesical calculus, or of a contracted prepuce, or of a rectal polypus, or of parasites inducing great straining efforts, the removal of the cause will generally effect a cure of this condition. The most important feature of the palliative treatment, however, is the continuous avoidance of either constipation or diarrhea, both of which give rise to straining at stool.

Polypus recti is not uncommon in children. It is the most common cause of hemorrhage from the rectum. Rectal hemorrhage in girls is often mistaken by parents for vicarious menstruation. This error, however, can easily be avoided, for in rectal polypus, the blood stain on the shirt is in the back, while in precocious menstruation the blood stain is in the front of it. The blood is never mixed with the feces and is usually found on the surface. The hemorrhages are slight, sometimes with pain and tenesmus. Polypi recti may be single or multiple and are attached to the rectum by means of a short or long pedicle. They are usually attached to a point 1½ or 2 inches above the anus, but they may be located high up in the rectum. They sometimes protrude during defecation and appear at the anus as a dark red globular tumor the size of a cherry or even smaller and usually present a bleeding surface. When a polyp is small it reenters the rectum immediately after defecation; but when it is large and remains outside it is usually replaced by the mother after each stool. If the polyps do not come down during defecation, recourse should be had to a thorough rectal examination. When located 2 or 3 inches above the sphincter a digital examination will suffice to diagnose the case; if located in the upper part of the rectum a proctoscopic examination will be necessary.

Anal fissure is more common in infants than in older children and probably develops as a result of trauma, such as the passage of a dry hardened fecal mass. Another cause of anal fissure may be necrosis, the result of hard scybala obstructing the circulation by pressing on the blood-vessels. Of course, any condition which produces rectal discharge or prolongs straining is likely to lacerate the delicate mucous membrane and cause an anal fissure. It is rarely due to congenital syphilis or tuberculosis. A very common cause of anal fissure is the frequent and careless introduction of the syringe nozzle when giving enemata. The fissure causes severe pain and violent outbursts of crying during defecation. Jacobi thinks fissure of the anus a much more common affection in children than is generally supposed, and believes that many fretful children who sleep badly and cry constantly, and often present symptoms simulating those of vesical calculus, really suffer from fissure of the anus.

The treatment of anal fissure is, as a rule, divided into the palliative and the operative. The palliative treatment is sufficient in most cases and consists of measures for preventing constipation, observation of local cleanliness and applications to the ulcer. It is usually remedied by a few applications of silver nitrate or balsam of Peru, in conjunction with the administration of laxatives; drastics, however, should never be employed. This simple treatment may be followed by a cure in cases in which the ulcer is small and not deep, and in which there is no sphincteralgia present. If these measures fail, cauterization should be resorted to. A 20 per cent. solution of cocaine is applied directly to the ulcer on a pledget of cotton to reduce the pain accompanying and following this procedure, and the fissure is then thoroughly cauterized either with the electric or Paquelin cautery point, or with the solid stick of silver nitrate or with phenol. The author likes the electric cautery knife and always employs it in preference to the other methods.

The operative treatment is the surest and quickest method of cure. There are several methods practiced for the operative treatment of fissure, but all have the same object in view, namely, the causation of a temporary paralysis of the sphincter, placing the ulcer at rest until repair can take place. Stretching of the sphincter with incision of the ulcer is most commonly practiced by surgeons. In some cases the painful contraction of the sphincter is relieved by passing the little finger into the rectum and partially tearing the sphincter muscles by stretching without incision or excision of the ulcer.

The after-treatment consists in keeping the bowels confined for three days and after this time daily movements are secured by laxatives. The ulcer usually heals in about two weeks.

Fistula-in-ano is a very rare affection in infants and children, and does not occur with sufficient frequency in these patients to render its diagnosis and treatment important.

The treatment of this affection consists in the free division of all the tissues between the external and the internal openings of the fistula without cutting through the wall of the bowel. Only the track of the fistula should be freely laid open and allowed to heal by granulation. The internal opening of the fistula should be touched up with a solid stick of nitrate of silver or with phenol, after which it is to be allowed to heal by granulation. By this means, the danger of incontinence is certainly avoided and the result is invariably good. The division of the sphincters in children is more likely to cause incontinence than it would in adults, irrespective of whether the muscles have been cut obliquely or at a right angle. This is because the delicate sphincter muscles and the nerve supply controlling them are not yet fully developed.

Fecal impaction, or coprostasis, is occasionally encountered in children and requires careful attention. Indeed, it occurs with sufficient frequency in children to render its diagnosis and treatment most important.

[The rectal diseases in children are of such frequent occurrence that they can not fail to be of importance. Proctoscopic examination offers a fertile field for investigation and study.—Ed.]

Study of the Stools in Children's Institutions Showing the Incidence of Intestinal Parasitic Infections. The stools of 595 children in seven institutions were examined for parasites by L. R. DeBuys and H. L. Dwyer.[4] The ages of the inmates varied from 3 months to 18 years, and included institutions in which there were both males and females.

The method of examination was as follows: The stools were secured at the various institutions and placed

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(4) Amer. Jour. Dis. of Child., October, 1919.

in pill boxes, and each box was labeled with the name of the individual from whom it was obtained. The stool was thoroughly macerated in distilled water and filtered through several thicknesses of gauze. The filtrate was then placed in a centrifuge with a velocity of 1,500 revolutions a minute for from ten to twelve seconds, after which the supernatant fluid was discarded, the residue again thoroughly mixed with distilled water and again centrifuged for a like period. If the fluid after the second centrifuging continued cloudy the residue was again washed and centrifuged a third time. Then the water was poured off and the residue spread on a slide. The examination was made with a minimum of light. This precaution was taken so as not to miss *Hymenolepis nana,* which is very translucent. The preparation was made thin enough for newspaper print to be discernible through it.

The specimen was then placed under the microscope and examined with the lower power to find the ova and then with the higher power for closer study and differentiation.

The authors found the frequency of the infections by the various parasites to be as follows: *Trichuris trichiura, Ascaris lumbricoides, Hymenolepis nana, Oxyuris vermicularis, Strongyloides stercoralis, Necator americanus* and *Hymenolepis diminuta.*

The hygiene, general care, duration of residence in the institution, previous environment, association with dogs, eating of dirt, absence of systematic medical inspection, seemed to have a direct bearing on the frequency of intestinal parasitic infection.

The two institutions where systematic medical inspections were made, even though there were many crawlers in one of these institutions, showed the lowest percentages of infections, namely, 17.89 per cent. and 19.00 per cent., respectively.

The two institutions with the heaviest infections were those where the population was transient and where there were no medical inspections, the infections being 90.2 and 83.33 per cent., respectively.

The youngest individual infected was in the least sanitary of the institutions investigated; this child was 2 years of age, and had a quadruple infection of *Trichuris trichiura, Ascaris lumbricoides, Oxyuris vermicularis* and *Strongyloides stercoralis.*

The relation of age to infection seemed negligible except that there were no infections among the infants; in other words, before the period of exposure there were no infections. The maximum number of infections occurred at the age of 11 years.

Males were infected over 13 per cent. more frequently than were females. Again the element of exposure seems to have had some influence. The maximum ages of the infections in boys were 11 and 12 years, and for girls, 13 years. Infections, however, were rather generally distributed over several years.

No information of value was obtained in studying the incidence at the different ages, except that the greatest incidence in boys was fourteen infections in twenty boys, or 70 per cent. of infections at the age of 12 years, and for the girls fifteen in twenty-one, or 71.5 per cent. of infections at the age of 8 years.

The symptoms usually attributed to "having worms" were as frequent, and some a little more frequent, in those not infected than in those infected.

One infection with the rat tape worm *(Hymenolepis diminuta)* was found in a female child, 3 years of age. The infection occurred in a triple infection of *Hymenolepis diminuta* and *Trichuris trichiura* with *Ascaris lumbricoides.*

An eosinophilia is a valuable aid in the diagnosis of infection with intestinal parasites. It is, however, not pathognomonic of, and its absence does not exclude, an infection.

The eosinophils were found as high as 28 per cent. in the positive cases, and 18 per cent. in the negative cases. They were 4 per cent. or above in 59.5 per cent. of the positive cases and 4 per cent. or above in 32 per cent. of the negative cases. It was of interest that all the eosinophilias of 15 per cent. and above in the positive cases occurred in the same institution.

No parasite in this study seemed to be accompanied by a definite eosinophilia. It was shown that the infection by any of the intestinal parasites in this study could exist with an absence of eosinophils. This was found in their single infections with the exception of *Necator americanus* and *Hymenolepis diminuta. Necator americanus* was found in single infections in only two cases, in which instances the eosinophils were 12 and 13 per cent. respectively. However, in mixed infection of this parasite with *Trichuris tichiura* and *Hymenolepis nana* the eosinophils were as low as 1 per cent.

The other exception was the *Hymenolepis diminuta,* which was not found in single infection, but in combination with *Trichuris trichiura* and *Ascaris lumbricoides,* in which case the eosinophils numbered 13 per cent.

Minimum eosinophil counts in double and triple infections were zero, while the maximum was 28 per cent. in each.

According to the authors, the diagnosis of intestinal parasitic infection is an extremely easy matter. The symptoms usually ascribed to worms are as frequent in those not infected as in those infected. Blood examinations showing eosinophilia are valuable diagnostic aids, but the only way to make a positive diagnosis is by either finding the parasite or the ova in the stool of the individual. Vermifuges, therefore, should not be given to the defenseless child unless it is known that an infection exists and its character is ascertained, when the specific drug should be given to combat the infection.

[The occurrence of intestinal parasites probably varies in different sections of the country. Frequency of occurrence in some sections of the country is in striking contrast with the infrequency in other sections.—Ed.]

The Ascaris Lumbricoides as the Cause of Urgent Symptoms in Disease Among Children. C. Pentland[5] has been very much impressed by the number of cases of severe acute forms of sickness directly attributable to worms, and in almost every case to the ascaris lumbricoides. In most of the cases which came under his notice, the source of the water was from "spring wells," samples of which he had analyzed. These were reported pure and free from traces of ova of the ascaris.

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(5) Practitioner, April, 1920.

Contrary to what one would expect, all of the children before being attacked were of an unusually healthy and vigorous type; one is accustomed to associate worms chiefly with strumous and delicate children. An acute attack of worms presents, from a diagnostic point of view, symptoms which are by no means characteristic. Pentland has found that severe pain referred to the umbilical region has been the most constant symptom, associated with a high temperature ranging from 103° to 105° F. Closely simulating an attack of peritonitis or appendicitis in its early stage, the tenderness apparent in some of the cases has been very pronounced and most acute; other local symptoms have been uneasiness, attacks of severe colic, vomiting and faintness, capricious appetite, and irregularity of bowels, constipation and diarrhea alternating.

The author urges that in the many forms of sickness, no matter how rare, among children it is advisable not to overlook worms as a probable cause of the urgent and distressing symptoms which one so often encounters. In the treatment of worms in children it is essential to build up the general condition, and improve it by administration of tonics, cod-liver oil, etc., as well as to clear out thoroughly the alimentary canal by keeping the bowels free in order to avoid unhealthy accumulation of mucus. Important prophylactic measures, militating against the development of worms in children, are the preservation of the digestive organs, strict cleanliness, fresh air, and attention to oral hygiene. Stools known to contain worms or their ova should be burned immediately.

[A very interesting contribution, though the statements lack adequate proof and can not be fully confirmed. One would be inclined to seek other causes than the presence of ascaris for a temperature of 103° to 105° F.—Ed.]

RICKETS AND SCURVY.

Clinical Rôle of the Fat-Soluble Vitamine: Its Relation to Rickets. In an extensive discussion of the causes of rickets, A. F. Hess and L. J. Unger[6] come to the conclusion that there seem to be several causes at work rendering the unraveling of the problem so difficult that there is a difference of opinion not only as to the particular dietary factor that is at fault, but even as to whether rickets is to be considered a disorder of dietetic origin. It should not be forgotten that a prenatal factor is involved. The fact that the negro infant living side by side with the white in the larger cities and obtaining milk from the same source develops rickets so frequently and so markedly, indicates that there are important influences to be reckoned with in addition to the food.

In considering the diet, a most important question is whether the recent theory as to the vitamine origin of this disorder can be maintained and, more particularly, whether rickets should be attributed to a lack of the fat-soluble factor. We can obtain the clearest understanding of this aspect by comparing this disease to the well-recognized and established deficiency diseases, scurvy and beriberi. What does the comparison show? In the first place, these two disorders are commonly accompanied by weakness and malnutrition; we do not encounter the strong, apparently healthy babies met in rickets. But of far greater moment is the fact that neither disease can be brought about by overfeeding. Rickets, on the other hand, frequently develops in infants receiving too much milk rich in fat, protein and salts. It seems impossible to the authors to bring this fact into consonance with a deficiency disease, whatever may be its nature, using this term in the commonly accepted sense. Their study shows that the fat-soluble vitamine is not the controlling influence; that infants develop rickets while receiving a full amount of this principle, and that they do not manifest signs, although deprived of this vitamine for many months, at the most vulnerable period of their life. It is impossible to interpret the contrary conclusion to which Mellanby came as the result of his pioneer experiments on dogs, or to accept the term "fat-soluble vitamine" as synonymous with "antirachitic factor," as Hopkins and Chick do.

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(6) Jour. Amer. Med. Ass'n., Jan. 24, 1920.

Clinical tests carried out with care must be accorded fully as much weight as laboratory investigations. The two methods of approach should be carried out side by side, and even the most thorough study on animals must be made to harmonize before it can be accepted as holding good for man.

The authors' work seems to show that the danger to infants of a diet deficient in fat-soluble vitamine is slight, provided it includes sufficient calories, and otherwise is complete. They can maintain their health and vigor despite amounts of fat-soluble vitamine so small as rarely to be encountered in times of peace. In spite therefore, of the fact that this vitamine is not widely distributed in Nature, a disorder that may be termed ''fat-soluble deficiency''—marasmus or xerophthalmia—is hardly to be apprehended from a clinical standpoint.

Calcium Metabolism of Infants and Young Children and the Relation to Fat Excretion in the Stools. L. E. Holt, A. M. Courtney and H. L. Fales[7] found that the average absorption of calcium oxide by healthy infants taking modifications of cow's milk was 0.09 gm. per kilogram of body weight. Since the average absorption of calcium oxide by breast-fed infants is about 0.6 gm. per kilogram, it may be assumed that 0.06 gm. per kilogram is the minimum normal absorption of infants taking modifications of cow's milk.

They found that the daily total excretion of calcium oxide in the stools ranged from 0.34 to 1.06 gm., averaging 0.70 gm. The excretion and the absorption of calcium were, in general, dependent on the amount of calcium intake, from 35 to 55 per cent. of the intake being absorbed.

To insure the average absorption of 0.09 gm. of calcium oxide per kilogram, the intake of calcium oxide should be at least 0.19 gm. per kilogram; to insure an absorption equal to the average found for breast-fed infants the intake of calcium oxide should be at least 0.13 per kilogram.

The best absorption of calcium was obtained when the calcium intake bore a definite relation to the fat intake, that is, when the food contained from 0.045 to 0.060 gm.

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(7) Amer. Jour. Dis. Child., February, 1920.

of calcium oxide for every gram of fat and when at the same time the fat intake was ample, not less than 4.0 gm. per kilogram.

An excessive calcium intake apparently did not increase the calcium absorption, the excess being excreted. When the intake of calcium oxide was very low, less than 0.10 gm. per kilogram, the absorption of calcium oxide was less than the normal calcium requirement of the body.

The total absorption of calcium oxide varied in general with the weight of the child; the per kilogram absorption did not vary regularly with either the age or the weight.

The relation of calcium excretion to soap excretion was not constant. The excretion of soap was directly related to the type of stool, that is, to the water content and to the reaction of the stool. The excretion of calcium was closely related to the calcium intake. On the average, the normal and constipated stools, with high soap content, were found when the intake of calcium was high and therefore, they showed the higher excretion of calcium. However, constipated stools, which contained more soap than normal stools, had lower calcium content. Non-homogeneous stools, with the lowest average soap content, showed the same content of calcium not held as soap as did the constipated stools, with the highest soap content.

The calcium that could be lost as soap was never a large proportion of the calcium intake. Even in the stools containing the most soap it was found to be less than three-tenths the calcium intake. The calcium lost as phosphate was shown not to be increased in soapy stools.

The calcium percentage of the total solids varied, as a rule, with the water content of the stools, diminishing as the water increased.

The calcium absorption was much lower when diarrhea was present. With an increased excretion of calcium in diarrheal stools, there was a marked decrease in soap excretion.

The calcium absorption by rachitic infants was much lower than that by healthy infants.

In the few cases in which observations were made on infants recovering from rickets, the calcium absorption was higher than the normal average. These infants had received cod-liver oil for a considerable period.

The administration of cod-liver oil regularly increased the absorption of calcium, unless diarrhea was present.

The Causation and Treatment of Rickets. E. Pritchard[7] believes that the essential and central feature of rickets is the want of calcification or mineralization of developing bone, and that this in its turn is due to the existence of requirements for calcium which for the time being are more urgent than of developing bone. These urgent requirements are the necessity for neutralizing acid bodies in the blood; in other words, to neutralize or compensate an existing acidosis. His argument is that all chronic conditions of malnutrition of whatever kind or from whatsoever cause finally terminate in an acidosis, and that all claims on alkaline bases arising in connection with the neutralization of this acidosis must be satisfied before those of developing bone are attended to.

The treatment of rickets resolves itself, according to this author, into prophylactic and remedial measures. Prophylaxis is concerned with the avoidance of those unhygienic conditions which favor the development of the various forms of malnutrition. Correct dieting is essential to avoid catarrhal conditions of the bowel, intestinal toxemias and insufficiency diseases, all of which by their respective routes lead to the common goal—acidosis. Excess of food, even though otherwise beyond criticism, is as dangerous as unsuitable food itself, for in the long run it necessitates a short circuiting of the metabolic processes and the production of acids of large molecular size, such as uric, oxalic, butyric, lactic, proprionic, and to some extent of such powerful acids as sulphuric and phosphoric, all of which must be neutralized at the expense of ammonium and other alkali reserves of the blood.

Any condition which interferes with oxidation will similarly restrict the completeness of the metabolic processes, and among them must be included want of fresh air, mechanical obstruction of the respiratory pas-

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(7) New York Med. Jour., Dec. 6, 1919.

sages by adenoids, embarrassments of the respiratory movements, as well as all other conditions which lead to anoxemia. Want of stimulation of the skin surface by cool air, good ventilation, or baths will similarly limit the oxidation processes.

Remedial treatment depends largely on the correct diagnosis of the cause of the acidosis, on the treatment of the acidosis itself, and on the management of the complications arising from the softening of the bone and of the emergencies which are secondary to the acidosis.

The treatment of the acidosis is by no means a simple task, especially in severe cases with air hunger, Cheyne-Stokes breathing, tetany, laryngismus stridulus or convulsions. There are, however, certain important indications which are as follows: (1) To restore the reduced alkali reserves of the blood; (2) to ensure a free supply of oxygen and relieve the embarrassments of the respiratory centers; (3) to raise the blood-pressure; (4) to promote the excretory functions of the kidneys; (5) to suspend temporarily the intake of food.

These are the measures which have been empirically proved to be efficacious in such extreme cases of acute acidosis as occur in cholera infantum, diabetic coma, and uremic conditions. The reduced alkali reserves and the fall in blood-pressure can both be relieved by the intravenous or subcutaneous injection of isotonic bicarbonate and citrate of soda. Oxygen can be supplied by inhalations, best by Haldane's continuous method.

The excretory functions of the kidneys can be promoted by such cardiac stimulants as camphor, digitalis, strychnine, alcohol, caffeine, etc., or by such direct stimulants as scoparium, turpentine, etc.

The treatment of deformities and mechanical disabilities due to softness of bone need not here be considered beyond referring to the uselessness of splints for the correction of deformities of the legs if these splints interfere with the one grand prophylactic against the cause of all the trouble, *viz.:* the taking of exercise. The treatment of emergencies, such as laryngismus stridulus, convulsions and tetany, is as a rule satisfactory and immediate if conducted on rational lines directed to counteract the effects of a severe acidosis.

[The acid theory of rickets is not new. Indeed the presence of acids in the blood was suggested more than once in the literature of the last century. The hypothesis had few adherents and was regarded as untenable. It has no more appealing force now than it had then.—Ed.]

Scorbutic Beading of the Ribs. According to A. F. Hess and L. J. Unger,[8] beading of the ribs, the so-called rachitic rosary, should not be regarded as pathognomonic of rickets. It occurs very frequently in connection with infantile scurvy and is one of the typical signs of this disorder, developing in the course of the disease, and disappearing rapidly with the recession of the other symptoms when an antiscorbutic foodstuff is given. This view is borne out by the clinical observations of the authors on man and on animals, as well as by postmortem examinations.

The authors believe that the rigid conception of this phenomenon as attributable solely to rickets led in the past to a confusion of infantile scurvy and rickets, and today is responsible for the misinterpretation of many cases of latent scurvy.

[This contribution attempts to separate completely rickets and scurvy. No mention is made of the fact that these two diseases may occur in the same patient. We are inclined to the view that this association is more frequent than the authors would lead us to believe.—Ed.]

Plea for the Earlier Recognition of Subacute Infantile Scurvy. L. Porter and W. E. Carter[9] have collected a series of thirty-nine cases of scurvy from three San Francisco hospitals since July, 1917. For the most part, these represent the extreme cases that find their way into the hospitals and into the hands of the children's specialists. The majority present the well-marked symptomatology of the florid type of scorbutus, *viz.,* swollen and bleeding gums, hyperesthesias, subcutaneous hemorrhages, flexion of the thighs, pseudoparalyses and swollen epiphyses due to subperiosteal hemorrhages.

Among them, however, are cases with less striking symptomatology, the *"scorbute froste"* of the French,

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(8) Amer. Jour. Dis. Child., May, 1920.
(9) Calif. State Jour. Med., December, 1919.

the "subacute infantile scurvy" of which Alfred Hess has written in this country. These cases are characterized by a symptomatology just as significant though not so spectacular as are the former. The authors are convinced that this type is much more common in California than is the florid type. They believe that most of these cases are overlooked and that in reality many uncomfortable and crying babies suffer from subacute scurvy. Without a doubt, a spontaneous cure is often effected because the age incidence of the disease corresponds roughly with the time at which mixed feeding is commonly begun.

In spite of the fact that when fully developed, the florid type of scorbutus presents an unmistakable clinical picture, many cases find their way into the hospitals with a previously made diagnosis of rheumatism, although every physician knows that rheumatism rarely occurs during the first and second years of life. This fact is all the more surprising when one considers how rich the literature on the subject has been ever since the first description of the disease was presented to the profession by Thomas Barlow in 1883.

TETANY.

The Effect of Intravenous Injections of Calcium in Tetany and the Influence of Cod-Liver Oil and Phosphorus in the Retention of Calcium in the Blood. A. Brown, I. F. MacLachlan, and R. Simpson[1] found that constitutional reactions are produced following intravenous injection of calcium lactate in 1.25 gm. doses. The degree of reaction varied from a slight drowsiness to almost complete collapse accompanied by dyspnea. The signs of reaction disappeared usually between one and seven hours; the more severe the reaction the longer it took the patient to recover.

Intravenous injection of calcium lactate in 1.25 gm. doses produces a temporary absence of both electrical and mechanical signs of tetany usually lasting from seven to ten hours.

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(1) Amer. Jour. Dis. Child., June, 1920.

Calcium lactate injected intravenously apparently exerts no beneficial therapeutic effect unless supplemented by the administration of cod-liver oil and phosphorus, and in this instance the reduction of the tetanoid symptoms is a little more rapid than with the employment of cod-liver oil and phosphorus alone.

Cod-liver oil and phosphorus produce an increase in the blood calcium with a corresponding reduction in the mechanical and electrical signs, within a period of from ten to seventeen days.

Etiology of Tetany. It is the belief of T. J. Elterich[2] that the underlying cause of tetany, in young children may be attributed to rickets, and in older children to a neurotic condition. In both instances, absorption of toxins from the alimentary tract is probably the active cause. As in rickets, changes in the calcium metabolism occur in this disease—more calcium is eliminated than is ingested with the food. Calcium absorption depends to a great extent upon the amount of fat in the food. In the economy of the infant, one of the most important functions of the fat is to facilitate the absorption of the calcium salts from the intestinal tract. In rickets, there is not only a lack of deposition of these salts, but also absorption of those already deposited due to hyperemia or, as expressed by Virchow, a process closely akin to inflammation. This may explain to some extent the negative calcium balance observed in rickets and tetany.

In older children, tetany occurs in individuals of a decided neurotic type. In cases of all classes, it is the author's experience that marked and often serious gastro-intestinal disturbances have either preceded or accompanied attacks of tetany.

The relationship between the absence or disease of the parathyroids and tetany in children has not been proved. It has been shown that these alterations have occurred in children who have shown no evidence of tetany and the disease occurs in children with perfect parathyroid glands.

Seasonal Incidence of Tetany—A Report of Forty-seven Cases. In an examination of the records of

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(2) Archiv. Pediatrics, February, 1920.

forty-seven cases of tetany treated in a dispensary, during a period of eighteen months, S. McLean[3] found that tetany was most common in the spring. This was found particularly true after a winter of unusual severity when the ventilation of dwelling houses was necessarily bad because of the cold and a shortage of fuel, and because during the winter infants did not receive the normal amount of outdoor air.

The average age of the children included in this study was 10 months; three of the infants were under 3 months of age; twenty-nine had one or more convulsions; the majority of these twenty-nine had had frequent convulsions; forty had Chvostek's sign. In twenty-two cases the parents had noted the presence of a crowing; in six cases breath-holding attacks had been observed; sixteen of the cases had carpo-pedal spasm and in one case there was carpal spasm alone. Trousseau's sign was noted in nine cases.

Ten of the children had been fed breast milk entirely; eight had breast milk supplemented with other milk, making a total of eighteen infants fed partially or exclusively on breast milk.

[We can subscribe to the fact that tetany occurs most frequently during the spring months. Whether this is due to the fact that the children have spent most of their time indoors during the winter is still open to question.—Ed.]

Spasmophilia. J. W. Van Derslice[4] discusses the theories of spasmophilia, and gives a general description of the findings, etiology and treatment. Soltman's investigations brought out that the cortex of the infant is not well developed until twelve to eighteen months of age, at which time it responds to irritation. The infant is a subcortical animal without the inhibitory influence of the cortex. Thiemich described individual pathologic spasmophilia characterized by exaggerated mechanical and electrical irritability of the peripheral nervous system. Baginski grouped under the heading of spasmophilic diathesis all the convulsive disorders without an anatomic basis.

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(3) Archiv. Pediatrics, February, 1920.
(4) Illinois Med. Jour., February, 1920.

Concerning the etiology, Czerny found a deficiency of calcium in the brain in tetanic children. Other investigators have found abnormalities in the metabolism of the alkaline salts. Heredity and neuropathic taint are mentioned. Artificially fed infants and digestive disorders are factors. Winter and early spring are the seasons of greatest incidence. The rôle of the parathyroids has not been definitely established. Symptomatically, spasmophilia is divided into eclampsia, laryngospasm, tetany and those cases without clinical manifestations.

The eclamptic form consists of convulsive seizures which were formerly regarded as epilepsy. There is a primary tonic and a secondary clonic stage. There may be an aura of restlessness, inattention or anxiety, followed by a sudden pallor, unconsciousness and a tonic convulsion of the face which may then extend to the entire body with each paroxysm as if a powerful electric current were passed through the body. There is considerable cyanosis and profuse perspiration. The convulsion gradually subsides and consciousness returns without being followed by the subsequent sleep characteristic of epilepsy. The frequency and duration of attacks constitute a variable factor.

The second form of spasmophilia the author calls laryngospasm glottidis. In the milder forms this manifests itself as strident, protracted crowing inspiration. In severe cases there are symptoms of asphyxia due to complete closure of the glottis. There is an anxious expression, cyanosis and short clonic contractions of the facial muscles and upper extremities ensue until the spasm is relieved by a forcible inspiration. The attacks are frequently induced by laughing, crying and in some cases even nursing irritates the glottis sufficiently to bring on an attack. The inspiratory stridor of laryngospasm is characteristic and whenever in a crying infant each inspiration is audible as a distinct crowing sound spasmophilia should be suspected. In severe cases, the spasm of the glottis extends to the diphragm. The cases with expiratory apnea not infrequently terminate fatally. With the delayed inspiration there is a marked slowing of the heart beat and at times there is an apparent cessation of the heart sounds for several seconds. When the case terminates during the spasm artificial respiration is of no avail as death is caused from cardiac stoppage. The author states that the plunging of the hypodermic needle into the heart muscle may stimulate it to further activity.

The third group comprises the cases called tetany, and is characterized by tonic convulsions of the extremities frequently accompanied by paresthesia of the affected limbs although consciousness is retained. The hands tend to assume the obstetrical position with thumbs bent upon the palm, fingers flexed over the thumb and in extension. The arm is flexed on the trunk and the forearm and hand are also flexed. The lower extremities are less frequently affected and when they are the hips are flexed as well as the knees. The spasms usually last about one hour, although they may last for several hours or days. There does not seem to be pain if the limbs are left contracted, although any attempt to straighten them causes pain. In severe cases, the convulsions may extend to the neck and face when the patient has a fixed expression, wrinkled brow and protruding mouth like a snout. The feet take the position of varus or equinovarus with pes cavus. The Chvostek sign is easily elicited. Trousseau pointed out that if the nerves of the arm were compressed the hand would assume the characteristic position of tetany. Chvostek's sign is more practicable and Trousseau phenomenon may bring on an attack of laryngospasm.

Spasmophilia tends to run a prolonged course and its progress is very irregular.

The principles of treatment that the author outlines consist of maternal nursing, sunlight and fresh air. Medicinally, calcium in doses of from 20 to 30 grain doses is given. The lactate and the chloride are the salts most frequently given. Cod-liver oil with phosphorus is recommended and parathyroid extract has been tried. Van Derslice gives a full dose of castor oil followed by bromides and chloral for the attack itself. All food is stopped for twenty-four hours.

[The spasmophilic diathesis is divided into two main groups: the latent, which is called spasmophilia, and the manifest, which is termed tetany. In the latter, eclampsia, increased electrical excitability, laryngismus stridulus, and the Chvostek and Trousseau signs may occur singly or in association with one or more manifestations.—Ed.]

ACUTE INFECTIOUS DISEASES.

MEASLES.

Recurrent Measles. After reviewing the literature for cases of recurrent measles, M. Salzmann[5] comes to the conclusion that although the proof is not absolute, a second attack of measles is likely to occur.

Relapses are seemingly more frequent than recurrences. The relapse usually occurs within six weeks after the first rash. There is nothing peculiar in the second measles as to prodromes, symptoms course or prognosis. One can not foretell the course of the second attack from the course of the first. When the first attack confers no immunity, the second attack does not confer either. This lack of immunity seems to be a hereditary trait.

Fordyce's Disease as Pseudo-Koplik Spots and a Cause of Mistakes in the Diagnosis of Measles. Attention is called by J. C. Regan[6] to the possibility of confusion between Koplik spots and Fordyce's disease or pseudo-Koplik spots.

Fordyce's disease is a chronic disease of the mucous membrane of whitish or yellowish, scanty or abundant, discrete, aggravated and often coalescent milium-like bodies, occurring more especially on the inside of the mouth, laterally along the line of the teeth as far back as the last molar, and possibly somewhat less frequently on the vermillion or mucus and inner surface of the lips. The lesions are from pinpoint to pinhead in size, and usually of a pale buff or oatmeal color. They are almost invariably imperceptible to touch, being situated on a level with the buccal mucosa, but at times they may send out hair-like projections which penetrate the mu-

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(5) Zeitschr. f. Kinderhlk., January, 1920.
(6) Amer. Jour. Dis. Child., June, 1920.

cous membrane. As a rule, the patient is unconscious of the condition, as subjective symptoms are lacking. The disease is most commonly encountered between the ages of 20 and 40, but it has also been observed in young children.

Regan believes that among the conditions of the mouth which may simulate Koplik's spots, Fordyce's disease deserves a place greater in importance than that accorded aphthous stomatitis.

Fordyce's spots are especially apt to be mistaken for Koplik's spots when they exist in patients who develop German measles. The similarity between the clinical symptoms of the two diseases is further increased by the presence of these pseudo-Koplik spots. The resemblance between the two types of lesions in such cases may be rendered closer still, because of the changes which the buccal mucosa undergoes in German measles which gives it a deeper coloration than normal. Being often more prominent at the site of Fordyce's spots, it gives them the appearance of an acute lesion.

Fordyce's disease is quite frequently mistaken for early Koplik spots in patients ill with various contagious diseases and exposed to measles, and whose buccal mucosa is being examined daily for the appearance of the true spots.

Children sent into a contagious hospital as cases of laryngeal diphtheria or influenzal croup may, at times, be isolated as possible beginning cases of measles owing to the presence of these lesions. (Catarrhal laryngitis plus coryza, being one of the modes of onset of measles, a careful examination of the buccal mucosa is made on the admission of all croup cases.)

The possibility of these pseudo-Koplik spots leading to errors in diagnosis when they are present in patients with suspicious looking maculopapular eruptions from serum or antitoxin, should be borne in mind.

Well-marked and pronounced examples of Fordyce's disease are unusual in young children. Slightly marked cases are, however, frequently seen even in infancy, but the lesions are so few in number, so small, and often situated so far back on the buccal mucous membrane, and of so nearly the normal color of the mucosa of a child, as usually to be overlooked, except where a careful search is being made for Koplik's spots.

The two types of lesions, Fordyce's spots and Koplik's spots, are, as a rule, so dissimilar that a differential diagnosis offers no difficulties to one familiar with their characteristics. Those unfamiliar with their appearances may, however, readily confuse them. The color, arrangement, distribution, evolution, size and location of the two lesions differ in so definite a way as to permit readily of their differentiation.

The Bordet-Wassermann Reaction in Scarlatina and Measles. L. Laederich and L. Bory[7] review the literature on the Wassermann reaction in scarlatina. In 617 cases of scarlatina, Boas found the Bordet-Wassermann reaction positive in thirty-nine; others have found a positive reaction in proportions ranging up to 50 per cent.

The authors report the following results:

With cholesterin antigen in twenty cases of scarlatina observed from the first to the fourth day of the eruption there was a total positive reaction in sixteen; almost total in three, and a doubtful result in one. From the tenth to the fifteenth day the reaction weakens or is lost. After the sixteenth day the reaction is always negative.

With other usual antigens under the same conditions the authors have had almost constantly either totally negative reactions or nearly totally negative reaction; only in two cases was there a doubtful reaction in the first or second day of eruption.

It might be concluded, therefore, that with a very sensitive antigen the Bordet-Wassermann test is constantly positive in the first days of scarlatina; and then constantly tends to become negative. There is no difference with regard to the intensity of the disease.

Thirteen cases of measles were studied with the cholesterin antigen: ten gave a positive reaction, two a doubtful, and one case a negative result. With other antigens the reaction was almost constantly negative.

The reaction in measles is very temporary. After the thirteenth to the fifteenth day it was entirely negative,

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(7) Bull. et mém. Soc. méd. d. hôp. de Paris, May 23, 1919.

except in two cases in which it persisted to the sixteenth and nineteenth days respectively.

DIPHTHERIA.

Active Immunization Against Diphtheria in a Large Child-Caring Institution. Schick tests made on 1,076 institutional children by J. Blum[8] during a period of five years show that a negative Schick test is evidence of the presence of sufficient antitoxin in the tissues to protect the individual against diphtheria infection.

The moderate or slightly positive tests denote an insufficient amount of antitoxin in the tissues to protect the individual. The tests called very faintly positive show possibly sufficient antitoxin to protect; however, it is possible that the transfer of virulent organisms to these individuals may cause them not only to become carriers but to suffer from a superficial infection without any constitutional toxemia.

Tests made on seventy-two families showed that the younger members of the same family usually gave corresponding reactions to the Schick test. Where variations did occur, the younger member gave usually the positive and the older the negative reaction. Infants under 6 months, because of the transmitted immunity of the mother, were exceptions to this rule.

Changes in the Schick reaction from negative to positive during the first three years of life, due to the loss of an inherited immunity, were found to be sufficiently numerous to justify retesting during this period at intervals of a few months. This procedure is especially desirable in infant asylums.

The full duration of the active immunity conferred on individuals susceptible to diphtheria by the injection of toxin-antitoxin is not yet ascertained. In one series of cases the immunity persisted in 100 per cent. of a group of fifty children for at least twenty-two months. Other workers have found that the immunity once acquired lasts for at least four and one-half years.

Blum states that it is possible to render a child-caring institution diphtheria free. This has been accomplished

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(8) Amer. Jour. Dis. Child., July, 1920.

for a period of five years at the Home for Hebrew Infants by injecting all susceptibles with toxin-antitoxin mixtures.

Active Immunization Against Diphtheria. After an extensive review of the literature on active immunization against diphtheria, E. Gorter and A. Ten Bokkel Huinnink[9] give a report of their experience with toxin-antitoxin injected into the pupils of a school in which there were several cases of diphtheria.

They found that the Schick test became negative in over 50 per cent. of the cases in which it was positive to begin with and that it remained negative in all those cases in which it was negative at the beginning. The authors conclude, therefore, that it is possible to increase the antitoxin contents of the blood without any risk by injections of von Behring's toxin-antitoxin. The antitoxin appears in the blood three weeks after the beginning of the vaccination and remains in the blood for from one and a half to two years.

The antitoxin content of the blood can be determined easily by the Schick test, although it is inferior to the Römer method. In children in whom the antitoxin has disappeared from the blood in from one and a half to two years after the first immunization a second injection of toxin-antitoxin showed a remarkably quick reappearance of antitoxin in the blood.

Studies on the Effect of Diphtheria on the Heart. Nineteen cases of diphtheria from a group of eighty studied by H. McCulloch[1] showed evidence of cardiac disturbance.

In those cases in which the effect on the heart was so profound as to interfere with the cardiac mechanism, the outcome was fatal. In this study the mortality rate was 100 per cent.

Patients whose heart muscle alone is involved depend for their recovery largely on the ability to preserve a cardiac reserve sufficient for their needs. The moment this reserve is used up cardiac failure results.

McCulloch believes that the occurrence of myocarditis following diphtheria is largely beyond our control; al-

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(9) Archiv. de méd. des enfants, June, 1920.
(1) Amer. Jour. Dis. Child., August, 1920.

though the outcome is determined, at least in some cases, by the protection the heart receives during the course of the disease and during convalescence.

Myocarditis due to diphtheria has a definite position among those factors that lead to chronic heart disease later in life.

MUMPS.

The Duct Sign in Mumps. The following sign, which is claimed to be constant in mumps, is described by D. M. Cowie.[2] The orifice of Steno's duct on the affected side or sides will present in cases of mumps a reddened spot measuring from 1 to 2 mm. in diameter. The duct will usually be found to project beyond the surface of the mucous membrane from 1 to 3 mm. In other words, the duct becomes teatulated. The duct is edematous and is usually pale, as a whole, thus accentuating the red central spot which, at times, gives the appearance of a minute ring because of the central opening which may appear darker. In some cases the greater part of the teating is slightly injected. Minute hemorrhagic points may be seen scattered over an area surrounding the duct as great as 2 cm. in diameter. The orifice of the duct is tumefied and from it, at times, may be seen to exude a limpid fluid.

The involvement of the duct is a progressive and retrogressive change. The spot usually appears first and is followed by teatulation with retrogression in the reverse order.

The duct sign was present in 96 per cent. of the author's cases and is probably present in all cases of parotid mumps at some time in the course of the disease.

Whether the duct sign is pathognomonic of specific parotitis or is present in other acute inflammatory conditions of the parotid gland has not been determined by the author.

Because of the occasional occurrence of teatulation of Steno's duct in a certain percentage of apparently normal persons and occasional redness of its orifice, careful differentiation should be made. The author advises that the duct sign should be regarded simply as corroborative evidence of parotid gland involvement.

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(2) Amer. Jour. Dis. Child., August, 1920.

TYPHOID.

Typhoid Fever in Infants. I. Crespin and B. Saracino[3] observed thirty-six cases of typhoid and six of paratyphoid among nursing infants in their hospital practice in Algeria within three years. They review the literature concerning typhoid fever in infants. Instead of being rare as is generally believed, it is, they state, rather frequent. In the hospital clinic, it was seen to occur in artificially fed infants; in only two cases were the infants entirely breast-fed and in both cases the mothers had typhoid. Of forty-two cases observed by the authors the previous state of the infant was normal in eighteen, and rather poor in twenty-four. Low resistance favors the entrance of the organism of typhoid.

Typhoid in Algeria usually appears at the end of the summer, in September especially. The disease can not be said to have a sudden onset. It lasts about twenty days.

There is nothing very demonstrative in the symptoms. Pulse and temperature are accelerated. Enlargement of the spleen is not trustworthy. Epistaxis is remarkable for its rarity in children. There are very slight nervous disturbances; twelve of thirty-six cases evolved with more or less intense nervous troubles, a few were even meningeal in character. The abdomen is often meteoric; diarrhea is frequent with characteristic yellowish color, and occasionally blood is found in the stools. In nine out of thirty-six cases the diarrhea was of the severe enteritic type; vomiting is frequent. The decline period generally evolves regularly.

There are distinct clinical types to be distinguished. Thus in the infant we can find the gastro-intestinal, the meningeal and the hepatic according to the predominance of the corresponding symptoms.

Six deaths were observed in the thirty-six cases of typhoid, giving a mortality of 16 per cent. The prognosis as can be seen is bad. All the fatal cases were in infants less than 1 year old.

The treatment ought to be as simple as possible.

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(3) Archiv. de méd. des enfants, April, 1919.

Warm baths and intestinal antiseptic lavage are very beneficial. Milk is well borne generally.

In the six cases of paratyphoid serologic tests made the diagnosis possible.

Acute Cholecystitis in Children as a Complication of Typhoid Fever. M. R. Reid and J. C. Montgomery[4] report the occurrence of a typhoidal empyema of the gall-bladder in a white girl of 8 years. The child had had typhoid fever beginning two months before her entrance to the hospital. She showed symptoms of cholecystitis and was operated upon, the surgeons being unaware of the fact that the infection was due to the typhoid bacillus. The culture from the removed gall-bladder, however, showed typhoid bacilli. The patient recovered completely. The authors recall that the gall-bladder is practically always infected during the course of typhoid fever and that the bacilli play an important part in the formation of gall-stones and cholecystitis. However, the incidence of severe gall-bladder complications is small as shown by Holscher's figures. He found five pathologic gall-bladders and one perforation out of 2,000 autopsies on typhoid patients.

The authors collected from the literature, eighteen cases of typhoid fever in children under 15 years who either died from or were operated on for complications arising in the gall-bladder. In one case, the acute cholecystitis did not develop until eight months after recovery from the disease. In all the other cases the complication came on during the course of the disease. Eight patients died without surgical interference. One out of ten patients treated surgically died. It is interesting to note that the white count has been low where the typhoid bacillus has been isolated in pure strain. The authors emphasize that gall-bladder complications that require operation should be carefully differentiated from those that do not require intervention. Slight pain and tenderness in the region of the gall-bladder associated with a slight degree of spasticity of the right rectus muscle are not so very unusual in the course of typhoid fever. The vast majority of the patients recover. Operating on typhoid fever patients for minor

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(4) Johns Hopkins Hosp. Bull., January, 1920.

symptoms of cholecystitis is probably only slightly less justifiable than operating upon all patients who have pain in order to prevent intestinal perforation. Nevertheless, the low operative mortality justifies operation when there is grave doubt as to the nature of the condition of the gall-bladder. Acute suppurative typhoidal cholecystitis should receive immediate surgical treatment, for in such cases rupture of the gall-bladder may occur, and thus lessen, many times, the chances of recovery. The authors believe the best treatment is cholecystectomy.

[There is no doubt that the typhoid bacillus may invade the gall-bladder and produce cholecystitis. More commonly, however, than is generally supposed, the typhoid bacillus may produce angiocholitis.—Ed.]

INFLUENZA.

Early and Late Secondary Complications of Influenza and Influenzal Pneumonia. A comparative study was made by J. H. Hess[5] of conditions as seen in the army with those of children and infants in civil practice.

The material the author used as a basis of study of the symptomatology, pathology, course, early and late secondary complications in children, infants and the new-born, is based on replies received from forty-five teachers of the diseases of children throughout the United States, on extracts from foreign literature, and a personal study of the records of cases as seen in the Cook County Hospital and the Michael Reese Hospital in Chicago.

The disease was characterized in infants and children by a great tendency toward family contagion, most of the children developing the disease when exposed, but in most instances running a short course extending over a period lasting from two to four days, and with less tendency toward serious complications than those seen in the adults in the same family. The severe cases with a tendency toward a prolonged course and persistent temperature curve have by several clinicians in their replies been considered as bronchopneumonia, even in

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(5) Trans. Sect. Dis. Child., Amer. Med. Ass'n., 1919.

the absence of physical findings, other than those attributable to a severe bronchitis. The author's necropsy findings in a number of cases lead him to agree with this conclusion and to the adoption of the newer nomenclature of hemorrhagic pneumonitis.

Flushing of the face was unquestionably a more common finding in the first wave of the epidemic, and when severe was frequently associated with a white ring about the mouth. Twenty-three writers describe this as a common finding; twelve state that it was not a prominent symptom in their cases. It was undoubtedly less striking in children than in soldiers.

Cyanosis was described as a prominent symptom by ten; five describe it only in the presence of bronchopneumonia and toxic cases. Nineteen state that it was an uncommon finding in uncomplicated influenza. Among soldiers it was invariably present in all cases of pneumonia, and in a large percentage of cases not diagnosed as pneumonia.

Nasal secretion was lessened early in the disease, with usually only a moderate increase later; the dry stage usually lasted from twenty-four to forty-eight hours.

A dry injected pharynx was described as a constant finding by all, with a tendency toward follicular infiltration.

Laryngitis was seen in varying degrees of frequency and was more common in the first wave of the epidemic, being present in from 10 to 20 per cent. of all cases.

Follicular involvement of the tonsils was a very rare finding during the first and second waves. During the third wave it was more frequently seen, and this gives rise to the question as to whether the third wave as seen among children in certain sections of the country was not in reality the same condition as seen during the early spring months almost every year and unassociated with influenza.

Epistaxis and bleeding from the thorax frequently occurred. It was usually not severe and required no treatment. It has been described as present in from 25 to 80 per cent. of the cases during the first wave. In the author's series of cases at Michael Reese Hospital four had profuse hemorrhage from the nose, and one was associated with severe pulmonary hemorrhage. In the remainder the nasal bleeding was insignificant.

Cough was constant and irritating in the majority of cases; and in adults was out of proportion to the physical findings.

Vomiting was described as a common symptom by fourteen, infrequent by nineteen, and six have emphasized the fact that it was more common in the later waves. Late in the epidemic, it was frequently associated with a marked acidosis, which called for energetic treatment. With the relief of the acidosis the vomiting usually disappeared.

Headache was commonly complained of by children old enough to express their discomfort. It was usually frontal.

Myalagia was only occasionally complained of, and was apparently less severe than that seen in the adult.

Delirium, while common, was usually of short duration, and seemingly dependent on the degree of toxicity. In only a few instances has it been described as of such severity as to require treatment in uncomplicated cases.

Profound prostration was noted by thirty as frequently present; more especially in the early part of the first wave; five report it as moderately frequent and four as uncommon.

Eighteen described bronchitis as usually of short duration. Some of the cases, however, showed a tendency toward chronicity, and these were usually associated with persistent hilum and peribronchial infiltration.

The temperature curve was described as being of an intermittent or remittent type by thirty-one in the severe cases and in those tending to run a prolonged course; not infrequently showing great excursions and resembling the septic type.

Late roentgenologic studies were reported by nineteen. Of these, twelve described persistent peribronchial infiltration as common, more especially in the cases accompanied by subacute and chronic bronchitis.

Levinson in his study of infants and children in the Michael Reese Hospital, drew the following conclusions:

"Nearly all the uncomplicated cases showed a leukopenia and a lymphocytosis. At the onset the leukocytes numbered from 4,000 to 6,400. After the first day they began to decrease in number, ranging from 2,000 to 3,000 on the second, third and fourth days. The leukopenia persisted until the patient was well on the road to recovery, when the count would rise to between 9,800 to 14,000—this usually being between the sixth and ninth days of the attack. The differential count was also characteristic. There was a change from the normal leukocyte count to a relative lymphocytosis on the second or third day. The rise in lymphocytes which was gradual, reached at times from 50 to 55 per cent. This condition persisted until the patient recovered, when the neutrophils rose from 67 to 70 per cent.

"In those cases complicated with pneumonia some of the cases showed a leukopenia with little change from the influenzal pictures, while others showed a tendency toward a moderate lymphocysis."

He found no basophils, and only a few eosinophils. As a rule there were no transitional cells in the blood.

In uncomplicated influenza in soldiers, Hess found, in most instances, a moderate decrease in systolic pressure, which averaged from 104 to 126, the diastolic pressure averaging from 54 to 80. The pulse pressure was from 35 to 54 with an average of about 42. In the pneumonias the systolic pressure was usually low, and this was more marked in the diastolic pressure.

In children, Levinson states that the blood-pressure gave a fairly uniform curve. Normal at the onset, the pressure, both systolic and diastolic, but especially the latter, would generally fall. Therefore adults and children show practically the same tendency in blood-pressure variations.

Hess reaches the following conclusions:

The general impression seems prevalent that influenza in infants and children was, on the whole, of a much less severe type than that seen in adults.

Influenza in infants and children as seen in private practice gave a better prognosis than was to be expected from the symptoms that were manifested early in the attack.

Breast-fed infants acquired influenza as readily as bottle-fed, but the course was less severe.

Tendency to the development of influenza among the new-born, is dependent on exposure to the infection at birth.

Secondary pneumonia as seen in private practice was also of a less severe type and associated with a lesser mortality than in adults.

Secondary pneumonia was more common in infants and children during the first wave, but the complications of the upper respiratory tract and pulmonary complications, other than pneumonia were more common during the second and third waves.

Institutional older children in the better classes of orphanages, etc., developed a minimum of complications and showed a low death-rate. The mortality in institutional infants varied according to the class of patients treated from moderate to very high.

The severest types and highest mortality were seen among infants and children in hospitals, owing to the fact that severe and neglected cases were those most commonly leading to hospitalization.

Older children were, on the whole, more susceptible to influenza and suffered as commonly from complications as did infants.

Influenza in the pandemic just passed was an infectious disease involving the whole respiratory system, from the nasal orifice to the lung alveoli, with a special predisposition for the production of capillary bronchitis and lobular pneumonia, and with a further tendency to complications either by direct extension or through the circulatory system.

The most consistent symptoms were headache, vomiting and a persistent cough.

The most common physical findings were high temperature, flushing of the face, conjunctivitis, and inflammation of the mucous membrane of the upper respiratory tract.

The most common complications were epistaxis, laryngitis, capillary bronchitis, pneumonia, empyema, otitis, mild nephritis of short duration and pyelitis.

The most common after-effects were a moderate secondary anemia, cough, persistent hilum and peribronchial infiltration, and cardiac dilatation.

Influenzal Croup. A clinical and laryngoscopic study of croup in patients affected with influenza lead H. L. Lynah[6] to believe that there are four distinct types of respiratory involvement according to the location of the lesion: (*a*) Laryngeal; (*b*) tracheobronchial; (*c*) bronchopulmonary or asthmatic, and (*d*) pneumonic.

A. The Laryngeal Type: This type of influenzal croup closely resembles diphtheritic croup, and is indistinguishable clinically unless a direct laryngeal examination is made. Sometimes a feature of influenzal croup is the absence of gradual, progressive rhythmic inspiratory and expiratory dyspnea which is frequently present in diphtheritic croup. At times in influenzal croup there is a persistent, recurrent glottic spasm which is very distressing to the patient. This may produce a well-marked inspiratory crowing sound, and if subglottic stenosis be present there is an expiratory croupy cough. The cough may be the combination of a whoop and a croup. In influenza the larynx and trachea are extremely irritable. The recurrent whoop and paroxysmal cough may even suggest pertussis. The whoop is caused by glottic spasm together with tumefaction of the ventricular bands which tend to close the glottic aperture. These children may become very blue and require intubation. Croup is purely an expiratory phenomenon, and is due to edema and inflammation of the subglottic and tracheal regions. When the stenosis is marked, physical examination of the chest may show that no air enters the lungs. Diminished respiratory murmur or a unilateral bronchial obstruction can not be elicited until after the airway has been made free by the introduction of an intubation tube or bronchoscope.

B. The Tracheobronchial Type: In these cases there may be a marked tracheobronchitis for several days before definite signs of respiratory difficulty or a croupy cough develop. The voice may be normal and the child may cry aloud though dangerous obstructive symptoms are present. Intubation may be necessary to save life, because of extensive subglottic and tracheal edema. The

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(6) Amer. Jour. Dis. Child., October, 1919.

larynx usually appears normal, but when a tracheoscope or bronchoscope is introduced into the trachea, the latter is seen to be fiery red and edematous. When the edematous flaccid posterior tracheal wall comes in contact with the anterior edematous mucosa the tracheal lumen and expulsive cough may be shut off almost completely. The trachea and bronchi may present a stippled appearance with scattered adherent plaques of tenacious mucus which may be blood streaked. Collections of glue-like mucus may completely obstruct a bronchus, and in the moderately severe types aspiration of the tenacious secretion may induce recovery if there be no lung involvement.

C. The Bronchopulmonary or Asthmatic Type: In these cases the onset may be extremely violent or the condition may be ushered in with all the premonitory symptoms of laryngo-tracheobronchitis. The child may be stricken with a fulminating influenzal asthma even while asleep. This may be mistaken for some form of food anaphylaxis, and the history may bear this out if we are told that the child went to bed in good health aside from a slight cold in the head. The lungs are enormously engorged with blood, and there is extreme difficulty with respiration. Violent glottic spasm may be present and add to the gravity of the picture. The cough may be lost completely. These patients rasp and wheeze and are profoundly prostrated. There is a short stridulous inspiration and a prolonged wheezing expiration audible at some distance. On introducing the bronchoscope, the physician may be surprised to find very congested bronchi comparatively free from secretion. A few streaks of tenacious bloody mucous may be present. As the secretion is poured out the pulmonary congestion decreases. Many of these children succumb within a few hours after the onset of the attack. When secretion is profuse it may be aspirated bronchoscopically and afford relief. The markedly engorged inelastic lung is not expanded on inspiration so that the functioning elastic vesicles are over-distended, producing acute pulmonary emphysema. If the condition becomes extreme interstitial or tissue emphysema may result. In cases of this type, the absence of cough may be noteworthy, even on the introduction of the bronchoscope. These children may be able to cry aloud at times. Their difficulty is expiratory. Epinephrine hypodermically may afford relief.

Finally there may be the lobar or bronchopneumonic types of dyspnea, with characteristic air hunger.

ENCEPHALITIS.

Focal Hemorrhagic Encephalitis. A. S. Root[7] reports the case of an infant, 15 months of age, who for three weeks had been in a state of profound somnolence, with no evidence of improvement taking place either physically or mentally as time went on. She was transfused with blood from her mother (who had not had influenza), and a striking improvement followed almost immediately, so that within a short period of time she came out of the comatose state in which she had been for so many days. The appetite returned, she gained in weight, the blood picture rapidly improved, and the obstinate constipation was overcome.

All indications point toward the child's being mentally defective. Whether or not there will be a restoration of, or improvement in, the mental faculties, the author believes it is impossible to say. It is, however, hard to dissociate the rapid and sudden betterment in the child's physical condition from the effects of the transfusion.

Studies in Epidemic Encephalitis. A filtrable virus was obtained by L. Loewe, S. Hirshfeld and I. Strauss[8] from the nasopharyngeal mucous membrane of fatal cases of epidemic encephalitis. The virus is said to be capable of producing in monkeys and rabbits lesions similar to those found in the human brain.

The virus has been carried through four generations in rabbits, transmitted to a monkey in the fifth generation, and then brought back to rabbits.

The virus can be recovered from the nasopharynx of animals innoculated intracranially.

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(7) Archiv. Pediatrics, September, 1920.
(8) Jour. Infec. Dis., November, 1919.

A natural immunity was found in approximately 50 per cent. of the authors' rabbits.

The Diagnosis of Epidemic Encephalitis. L. Loewe and I. Strauss[9] report that the Berkefeld filtrates of nasopharyngeal washings from cases of epidemic encephalitis produced characteristic lesions when injected intracranially into rabbits. This finding has served the authors as an aid to diagnosis in 78 per cent. of the cases so tested.

A minute filtrable organism has been recovered in eleven of the seventeen nasopharyngeal washings cultivated, or 64 per cent.

Inoculation of rabbits with the cerebrospinal fluids of patients with epidemic encephalitis confirmed the diagnosis in twelve of the sixteen fluids injected, or 75 per cent.

Cultures of cerebrospinal fluids have been positive in ten out of twenty cases, or 50 per cent.

Positive results with cerebrospinal fluid sharply differentiate this disease from poliomyelitis.

The control studies have been uniformly negative.

Epidemic or Lethargic Encephalitis in Children. The various phases of lethargic encephalitis are described by J. B. Neal.[1]

There is a gradual onset followed by marked lethargy and asthenia; headache; low, irregular temperature; frequently cranial nerve palsies. Other paralyses may occur. A mask-like expression is often present. The onset may be sudden and is so more frequently in children than in adults. Other striking features that may be present are catatonia, marked tremors, choreiform movements, profuse sweating, insomnia, delirium, and a marked twitching of certain groups of muscles. A slurring, hesitating speech, with a very slow response is quite characteristic. One asks the patient a question. There is a long pause. Finally, after one has become certain that the patient has not heard or will not respond, he answers correctly in a low, monotonous voice. Disturbances of vision, either diplopia or blurring are fairly common, and are very diagnostic symptoms.

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(9) Jour. Amer. Med. Ass'n., May 15, 1920.
(1) Archiv. Pediatrics, June, 1920.

These occur or are elicited more frequently in adults than in children.

The course of the disease is often remarkable for the sudden, transient changes in the condition of the patient, either for the better or worse. These changes show themselves most in the mental condition and are often very temporary, so that the physician must be guarded in making a prognosis until he has studied the case for a time and gained some idea of the patient's average condition.

The most striking feature of the disease, especially in adults, is the prolonged course. Cases will run two, three or even four months with such light changes from week to week that they are the despair of the physician as well as of the family. Many seen at the height of the disease appear so desperately ill that one who is not fairly familiar with such conditions would be quite hopeless as to the ultimate outcome. These prolonged cases are very unusual in children.

A differential diagnosis in children must be made from tuberculous meningitis, brain tumor, meningism with some unknown underlying cause, syphilitic involvement of the central nervous system, and poliomyelitis or polio-encephalitis and meningitis. In adults, especially, cerebral hemorrhage or thrombosis and uremia must be considered.

The diagnosis from tuberculous meningitis is by no means easy in the more typical cases. After studying a number of these cases one may hazard a guess from the clinical picture and judging by the patient not seeming so ill as a case of tuberculous meningitis would be, assuming that it is a case of two or three weeks' standing. Vomiting is a less constant feature, and the pulse is more likely to be regular in encephalitis than in tuberculous meningitis. The final diagnosis will rest on the examination of the spinal fluid and even here the first examination may leave us in doubt.

If the case is seen early, the physician, even with the examination of the spinal fluid, may be in doubt as to the diagnosis and must await the further development of the case and the examination of the fluid at a later stage.

Brain tumor is comparatively rare in children and usually shows a more protracted course than does encephalitis. Choked disc, which occurs in brain tumor, does not occur in encephalitis, though some edema may be present. The spinal fluid findings are not constant in brain tumor, sometimes showing an increase in cells, though rarely an increase in albumin and globulin, so that it will not be of great help in making the diagnosis. Brain tumor is more often a stumbling block in the diagnosis in adults. Several cases which had been diagnosed as encephalitis at Bellevue proved at autopsy to be brain tumor.

Meningism, in mild cases, is sometimes suspected, occurring perhaps with the gastro-intestinal upset that sometimes accompanies encephalitis, but this will be ruled out by the normal fluid found in meningism. Certain cases of meningism, to be sure, do not show a perfectly normal fluid, but may show an increase in the proteid content or cells or both. These cases usually fall into four well-defined groups: cases with severe and prolonged convulsions as the convulsive type of whooping-cough; cases in which the meningism has been persisting for a long time without relief of pressure, especially in patients who are moribund when seen; cases with an inflammation near the meninges, as otitis media, mastoid or sinus involvement, called by Strauss "meningitis sympathetica;" and a miscellaneous group of special conditions—mumps, typhus, etc. The author believes that when changes are found in the spinal fluid, careful search must be made for some such underlying cause as those mentioned above before assuming that it is a simple case of meningism.

Syphilis of the central nervous system is less common in children than in adults, and, therefore, is seldom a problem in differential diagnosis.

Neal assumes that a negative Wassermann rules out a syphilitic condition of the central nervous system. The differential diagnosis from the encephalitic form of poliomyelitis is, in certain mild cases, quite impossible. Since at the present time we are having so few typical cases of poliomyelitis and since, even in the epidemic of 1916, we saw very few of the encephalitic type, it seems more logical to consider these cases encephalitis. Probably neutralization tests are the only method of making the diagnosis and these tests are not always satisfactory.

The diagnosis from the various forms of acute purulent meningitis is usually not difficult, though certain cases of encephalitis, with an acute onset, have been considered cases of epidemic meningitis. The clinical symptoms in atypical cases may be sufficiently similar to cause confusion. The examination of the spinal fluid, however, will establish the diagnosis, the fluid being of varying degrees of cloudiness and showing an excess of polymorphonuclears, a diminished or absent Fehling's and the causative organisms.

The diagnosis from cerebral thrombosis or embolism may not be easy, as sometimes a monoplegia or a hemiplegia may be present in encephalitis and of course, cases with cerebral hemorrhage or embolism usually show drowsiness and a slowness of response. This diagnosis, as well as that from uremia, must, of course, be made chiefly in adults.

The blood picture in encephalitis is not characteristic. It may be normal or may show slight leukocytosis, perhaps up to 15,000. The blood cultures are sterile. The urine is negative or shows the mild degree of nephritis that is common in acute infectious conditions. The examination of the spinal fluid throws more light on the diagnosis than does any other laboratory procedure.

The spinal fluid shows practically the same picture as in poliomyelitis. It is clear and is usually increased in amount. The cells are usually slightly or moderately increased, seldom greatly, perhaps up to 150 or 200. The cell counts may run higher in poliomyelitis; the great majority do not. As in poliomyelitis, there is usually an excess of mononuclears, but an excess of polymorphonuclears may occur. The albumin and globulin are increased in varying degrees, the reduction of Fehling's is normal. The increase in cells and protein content is not always in the same ratio. No organisms are reported by smear or culture by most workers. The gold chloride curve depends apparently on the amount of albumin and globulin present and duplicate curves may be selected from those in poliomyelitis fluids. In some instances, more often in convalescent or mild cases, the findings may depart little from the normal. This is true also in poliomyelitis. Many reports of encephalitis show that the cell count falls off very quickly. This has been the author's experience in most instances. In two cases of long duration, the character of the fluid did not change materially over a period of several weeks, but the condition of the patients also showed little change. As in poliomyelitis the fluid may in rare instances be slightly blood-tinged, probably indicating a more than usually severe hemorrhagic process. This comparison with poliomyelitis is made not because the two diseases are at all identical, but to emphasize the fact that in each instance the spinal fluid is not specific, but shows the reaction of the meninges to an inflammation of the brain substance. A somewhat similar condition exists in the various syphilitic involvements of the central nervous system, but in these conditions the gold chloride curve and the Wassermann test are helpful in making the diagnosis.

The most difficult and the most needed diagnosis is that made from the fluid of tuberculous meningitis. While generally the number of cells and the increase in albumin and globulin is greater in the latter disease, it is by no means always so, and it is sometimes necessary to examine more than one fluid before one can be certain of the diagnosis, as it is often difficult to find the tubercle bacillus in early tuberculous meningitis and the reduction of Fehling's may be normal, at that time. The reduction of Fehling is usually diminished or lost in late cases of tuberculous meningitis.

Inoculation of monkeys, with the emulsified brain and cord from fatal cases has not given conclusive results. Most observers report that they are unsuccessful in reproducing the disease in monkeys. Strauss, Hirschfield and Loewe,[2] however, report the successful reproduction of a disease which they consider encephalitis both in monkeys and rabbits, by using the emulsified brain substance of a fatal case of encephalitis.

Post-Influenzal Encephalitis. Eight cases of post-influenzal encephalitis were studied by H. Heiman.[3]

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(2) Pages 89 and 90, this volume.
(3) Amer. Jour. Dis. Child., August, 1919.

He was able to differentiate three main forms, depending on the severity and the most prominent symptoms, *viz.:* (1) irritable, (2) lethargic, and (3) lethargic with paralysis.

The irritable type is characterized by marked restlessness, excitability and almost continuous crying.

The lethargic form presents the drowsy state. The features are expressionless, mask-like, resembling the Parkinson syndrome. There may be occasional convulsions, or twitchings of the face muscles, and frequently a moderate rigidity of the neck. Most of the author's cases fell into the third group of lethargy with paralyses. In this type there is found, in addition to the stuporous state, some form of paralysis and frequently convulsions. There was also at times an involvement of the extremities or cranial nerve palsies.

The youngest patient observed was 4 months and the oldest 13¼ years; there were three patients under 1 year and four under 3 years.

The percentage of males and females was equally proportioned.

All the cases showed a previous influenzal infection. In one case the nervous syndrome followed immediately, and in another four months elapsed. The average interval was two weeks. In six cases the onset of encephalitis was sudden, in two there was a gradual progressive development. Convulsions were the first manifestations in three cases, stupor in four, marked irritability in one.

Fever played a small rôle in all cases.

The fundus was examined in all cases but showed nothing characteristic.

Only one of the eight cases showed definite change of cerebrospinal fluid. There were 80 cells per c.m., 80 per cent. of these being lymphocytes. Albumin was present and there was also a definite reaction to Fehling's.

There was no uniform change in the blood picture. Most of them, however, showed a leukocytosis.

The prognosis was better than anticipated. There were no fatal cases. The mentality had been definitely affected in two cases.

According to the author there is no specific therapy. For the irritable type mixed bromides and chloral are of some value. In the paralytic type massage of the involved muscles is of distinct advantage. Good results have been reported from lumbar puncture, although this procedure was of no specific benefit in the author's cases.

WHOOPING COUGH.

The Benzyl Benzoate Treatment of Whooping Cough. Satisfactory and immediate results were obtained by T. E. McMurray[4] in the treatment of whooping cough by the use of benzyl benzoate. The dose given was from 5 to 30 minims every four hours, depending upon results. In some cases decided improvement was noticed from the smaller dose, in other cases larger doses were employed. In almost every instance the treatment determined subsidence of the paroxysms.

The effect usually made itself felt within forty-eight hours and in one instance there was relief after the second dose. As a rule the relief was immediate and complete. Although it is necessarily somewhat difficult to estimate the efficacy of a remedy in such a capricious disease as whooping cough, the author thinks he is entitled to conclude from his experience that it not only does in many cases afford immediate relief of severe spasms of coughing, but it also seems to lengthen the interval between attacks. So far as McMurray's experience goes, this treatment gives rise to no undesirable results. He gave 20 minims to a child 12 months of age with no evidence of gastric or any other disturbance.

Convulsions in Whooping Cough. In a series of 342 whooping cough patients, ranging in age from early infancy to 12 years, F. Reiche[5] observed twenty-nine cases with convulsions; fifteen of this number were male and fourteen female. The greatest number of convulsions were observed in children under 3 years of age.

The direct cause of the convulsions varied. In one case there was a necrotic tonsillitis with the whooping

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(4) New York Med. Jour., July 24, 1920.
(5) Zeitschr. f. Kinderhlk., May, 1920.

cough; in three cases there was an infection of the meninges, one of which was caused by the streptococcus, the other by *Staphylococcus aureus* and the third by the pneumococcus. In one case in which pneumonia was present, the convulsions may have been brought on by an overwhelming amount of CO_2 in the blood. In one case there was otitis media. In five cases the whooping cough was complicated by tuberculosis (tuberculous meningitis, 1; solitary tubercle, 1; military tuberculosis, 2; tuberculosis of the bronchial and mesentery glands, 1). In three cases there was a sinus thrombosis. In seventeen cases nothing else but the whooping cough itself could account for the convulsions.

Most of the children were well-nourished. The convulsions usually made their appearance in the fifth week of the disease. In one case it started at the end of the second week.

All of the twenty-nine cases observed terminated fatally. All but three children died in the hospital.

[The statistics of Freud and Rie show that many cases of encephalitis have been preceded very shortly by whooping cough. It has also been pointed out that cerebral and spinal hemorrhages are not infrequent complications of whooping cough. It is at once noteworthy and surprising that all of the twenty-nine cases described by Reiche terminated fatally.—Ed.]

POLIOMYELITIS.

Influence of Epidemic Poliomyelitis on the Susceptibility to and the Symptomatology of Other Contagious Diseases. The small number of mixed infections in cases treated at the hospital for poliomyelitis lead J. C. Regan[6] to believe that children with poliomyelitis are not so liable to develop other contagious diseases as normal children, with the possible exception of whooping cough. This latter was the only contagious malady prevalent among the poliomyelitis patients during the epidemic.

A working theory to explain this temporary relative insusceptibility may, the author believes, be based upon

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(6) Archiv. Pediatrics, May, 1920.

certain fundamental principles of bacteriology: Upon infection with the virus of poliomyelitis certain changes occur in the tissues of the infected individuals, due, possibly, to the products of growth of the organisms of poliomyelitis, which render them unsuitable for the development of the causative agents of other acute contagious diseases. In other words, a condition of antagonism exists. It may be that the causative factor of Heine-Medin's disease is so thoroughly distributed and numerous in the nose, throat and upper respiratory tract that the infective agents of other acute contagious diseases find it difficult to obtain an atrium in which they can develop to a sufficient extent to invade the body. The only germ which seems clinically to have a symbiotic relation with that of poliomyelitis is the bacillus of whooping cough.

The influence of poliomyelitis, on the symptomatology of scarlet fever, diphtheria, varicella, measles and parotitis seems to be negligible with the one exception that symptoms of the associated diseases were milder than usual. The only malady in which symptoms were observed to be definitely modified was pertussis. Thus in cases of poliomyelitis, with paralysis involving the muscles of the larynx, the paroxysmal cough was often rendered much less audible and the whoop so soft as only to be heard if one was quite close to the patient.

The mortality rate of these mixed infections was remarkably low, namely 2 per cent., compared to 23.79 per cent. in the straight poliomyelitis cases.

MENINGITIS.

Qualitative and Quantitative Changes in the Cerebrospinal Fluid of Various Diseases and Their Significance. A. Levinson[7] studied the cerebrospinal fluid of 155 cases that presented some form of meningeal involvement. Of this number 100 specimens of fluid were obtained from cases of meningism, that is, cases in which there was rigidity of the neck, a positive Kernig and Babinsky, but in which the meningeal symptoms soon subsided and an infection in some other part of the body

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(7) Amer. Jour. Dis. Child., December, 1919.

made its appearance. Fifty-five fluids were obtained from various forms of meningitis, the greatest number coming from cases of meningococcus and tuberculous meningitis.

From the data obtained, the author draws the following conclusions:

The changes in cerebrospinal fluid in various diseases can not be generalized, each disease presenting at least some changes peculiar to itself.

Classification of cerebrospinal fluid changes must take into consideration qualitative as well an quantitative changes.

There are three types of conditions that produce changes in the cerebrospinal fluid; meningism, meningitis and systemic disturbances.

The meningismal changes manifest themselves in an increase in pressure and amount of the fluid. Occasionally, there are also cytologic and chemical changes.

There is no evidence of acidosis in the cerebrospinal fluid of meningism.

The mode of production of meningism is mechanical, being due to an increase in blood-pressure in the cranium.

Changes in the cerebrospinal fluid of various forms of meningitis differ from each other not only bacteriologically and cytologically, but also physically, chemically and physicochemically.

The cytologic, chemical and physicochemical differences in the various forms of meningitis are both quantitative and qualitative.

The H-ion concentration of the fluid of suppurative meningitis is often increased.

The H-ion concentration of the fluid of tuberculous meningitis runs parallel with that of normal fluid.

One of the indications of the presence of a meningitic process as distinguished from meningism is the presence of sediment in the fluid.

The systemic changes in cerebrospinal fluid are encountered during the course of metabolic diseases and manifest themselves in an increase of certain chemical constituents in the fluid, such as chloride in nephritis and sugar in diabetes.

The various types of changes in the cerebrospinal fluid can be used for the diagnosis of various diseases.

A useful diagnostic means for the differentiation between various types of meningitis is the behavior of the fluid toward various precipitants such as alkaloidal and metallic precipitants.

The Catalase Content of the Cerebrospinal Fluid. The presence of catalase in cerebrospinal fluid was determined by A. Levinson and F. C. Becht.[8] They found that while the presence of catalase indicates the presence of many cells or of a coagulum in the fluid there is no advantage in the catalase examination for practical purposes. The cell count done immediately after withdrawal of the fluid from the body will give more accurate information without necessitating the use of complicated apparatus.

An Early Diagnostic Sign in Basilar Meningitis. A symptom that has served the author during the past seven years as an aid in making an early diagnosis of basilar meningitis is described by G. Gingold.[9] The symptom consists of the following:

By flexing the head on the chest, either a bilateral or a unilateral internal strabismus develops, which will last as long as the head is kept in a flexed position, and disappears as soon as the head is relaxed. In many cases the strabismus is accompanied by a retraction of the upper eyelids. In some cases he noticed a contraction of the pupils. This ''reflex'' strabismus was present in the early stages of almost every case that came under the author's observation. In the late or paralytic stage flexion of the head failed to produce a strabismus.

What appeals to Gingold as a reasonable explanation of this early ''reflex'' strabismus is that by flexing the head we suddenly increase the already increased pressure at the base. This causes either pressure on the abducens with a paresis of the external rectus, or it causes pressure on the oculomotor nerve with a spasm of the internal rectus. The last mentioned theory will also account for the action of the levator palpebrae and the myosis noted in some cases.

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(8) Jour. Amer. Med. Ass'n., May 8, 1920.
(9) Archiv. Pediatrics, January, 1920.

Incidence of Bovine Infection in Tuberculous Meningitis. It is generally conceded at the present time, says N. Novick,[1] that the invasion of the meninges by tubercle bacilli is of a secondary nature; there is, it is believed, a pre-existing focus of tuberculous infection in the human body which later gives rise to a tuberculous meningitis. Whether the disease develops in infancy, childhood or later in life, it is assumed from the results of many investigations that the type of tubercle bacilli which has caused the primary focus of infection has not undergone any changes during its dormant period—that is, the period between the primary focal infection and the time when the case gave clinical evidence of, and was recognized as, tuberculous meningitis.

In other words, if the tubercle bacilli associated with the primary infection originated from bovine sources, they are, according to present belief, not likely to have undergone any distinct biologic changes, which at the time of their isolation could obscure their being identified by present methods (thus leading to a classification as of the human type).

The author studied forty-eight cerebrospinal fluids for the type of tubercle bacillus in order to ascertain, whether the percentage of incidence of bovine infection in tuberculous meningitis is appreciable, greater perhaps, than is commonly accepted; whether the bovine type of virus has a special predilection for the meninges.

Park and Krumwiede in a study of 1,000 cases of all forms of tuberculosis, found 15 per cent. of bovine infection in tuberculous meningitis. Rosenau, analyzing 10,040 cases, including those studied by Park and Krumwiede, by the British and German commission, and some other cases collected from the literature, came to the following figures: 16 years and over, 686 cases, nine bovine, 1.3 per cent.; between 6 and 16 years, 132 cases, thirty-three bovine, 25 per cent.; under 5 years, 120 cases, fifty-nine bovine, 49 per cent.

The striking feature of these figures is the alarming percentage of bovine infection in children under 5 years (49 per cent.). In adults the percentage is very small,

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(1) Jour. Med. Research, January, 1920.

almost insignificant. Undoubtedly it is due to milk entering as the chief element in the diet of children and serving as the probable path of transmission of tuberculous disease, and the fact that the bovine bacilli are much more virulent in the young.

For percentage accuracy and in order to get at an unbiased determination of the type of infection, the cases in this study were not selected as to age or family history.

Of the forty-eight strains of tubercle bacilli isolated from the cerebrospinal fluid of forty-eight clinical cases of tuberculous meningitis in the author's series, three of the strains have proved to be of the bovine type.

The Early Recognition of Hydrocephalus in Meningitis. K. D. Blackfan,[2] reviews his previous work on hydrocephalus and reports a further study of twenty-five cases of hydrocephalus by means of the phenosulphonephthalein test and by means of roentgengrams made after the injection of the ventricles with air.

The majority of the cases of hydrocephalus in his series occurred in meningococcus meningitis. Of twenty-five cases occurring in the course of acute meningitis, seventeen were due to the meningococcus. Communicating hydrocephalus developed in eight of the seventeen cases, and in nine the obstructive form was found. Ten of the seventeen patients in this series died and seven recovered. Two of the seven patients had an obstructive hydrocephalus and improvement followed promptly after the introduction of antimeningococcus serum into the ventricles. In four cases in which a communicating hydrocephalus was present, the process became arrested after treatment. The patients made an uneventful recovery. One patient developed a chronic hydrocephalus (communicating).

Attention is called by the author to hydrocephalus developing in meningitis by the onset of certain symptoms. The diagnosis is readily established when the condition is of long duration and the symptoms of increased intracranial pressure—headache, stupor, vomiting, enlargement of the head and changes in the eye-

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(2) Amer. Jour. Dis. Child., December, 1919.

grounds—are present. The early manifestations of hydrocephalus, however, are so closely interwoven with the symptoms of the meningitis itself, that they are often difficult to recognize. Hydrocephalus should always be suspected with the persistence of symptoms of meningeal irritation (fever, hyperesthesia, irritability or drowsiness, rigidity of the muscles of the neck and extremities, hyperactive reflexes, tremors, etc.) or their reappearance after the symptoms of meningitis have subsided. Infants invariably have a tense and bulging fontanelle and in children, Macewen's sign is positive. It should be remembered that these symptoms can not always be referred to the hydrocephalus alone. At the onset of acute meningitis and throughout the course of the disease we often see manifestations indicative of increased intracranial pressure—headache, fever, vomiting and muscular rigidity—which do not mean necessarily that hydrocephalus is present. The author believes that much confusion has been caused by referring to such a condition as hydrocephalus. For instance, in tuberculous meningitis there is present quite constantly a marked increase in the amount of cerebrospinal fluid, but at necropsy a picture quite the reverse of that seen in hydrocephalus is found. The sulci are distended with fluid, the brain is edematous, and though there is a varying increase in the size of the ventricles, one does not find flattening of the convolutions, atrophy and compression of the brain substance and the marked dilatation of the ventricles which characterize the latter condition. A number of patients with tuberculous and meningococcus meningitis who presented such symptoms have been studied by determining the amount of cerebrospinal fluid withdrawn, by the phenolsulphonephthalein test and the pathologic findings at necropsy. In these patients there was no interference with the absorption of cerebrospinal fluid and at necropsy the findings characteristic of hydrocephalus were not present. It is not at all likely that an increase in the amount of cerebrospinal fluid can produce other than a temporary and insignificant hydrocephalus, unless there is an associated diminution in the absorption of the fluid.

RHEUMATISM AND ARTHRITIS.

The Insidious Aspect of Rheumatic Fever in Childhood. It is a fact, says A. G. Helmick,[3] seemingly not recognized, that rheumatic fever is a disease that differs widely in its clinical manifestations in children as compared to adults; while the condition approximately prevails with equal frequency both in adults and children, the clinical picture is entirely different.

In adults rheumatic fever is characterized by the arthritic type, while in children it is characterized by inflammation in the heart, joints or both.

Before the second year, rheumatic fever is practically unknown and up to the fifth year the probable incidence of the disease is very slight, while multiple neuritis, specific bone lesions, tuberculosis of the bones and joints osteomyelitis and scurvy, all of which may simulate it, are of common occurrence. Rheumatic fever is sometimes confused with the malaise of grippe. An interesting and important factor is that heart symptoms are always accompanied by higher fever than joint symptoms and the fever is higher in pericarditis than in endocarditis, a point about which, without thought, the opposite might seem to be true.

Chorea should be regarded, according to the author, as much a manifestation of rheumatic fever in children as the articular symptoms are in the adult.

It is important to be able to differentiate the cardiac involvement from the symptoms shown, since the toxins of this disease attack the endocardium, myocardium and the pericardium.

Etiology of Arthritis Deformans in Children. From a study of ten cases of arthritis deformans in children, A. H. Byfield[4] reaches the following conclusions:

Arthritis deformans in children results chiefly from a chronic infection situated in the tonsils and adenoids and in the accessory sinuses of the nose.

In children less than 3 years of age the portal of infection seems to be limited to the tonsils and adenoids. After this age removal of tonsils and adenoids is ineffective in arresting the progress of the disease.

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(3) Ohio State Med. Jour., September, 1919.
(4) Amer. Jour. Dis. Child., February, 1920.

A sinus infection should be suspected as an etiologic factor if, after the tonsils and adenoids are removed, there remains elevation of temperature (even if slight), leukocytosis, poor appetite, together with a slowness of the joints to become less painful and swollen.

Relapse and exacerbations are definite indications of the need of nasal treatment.

Poncet's disease is probably no more than arthritis deformans in an individual infected with tuberculosis.

Although supportive and orthopedic measures are helpful, surgical treatment of the nasal sinuses is to be regarded as the most important therapeutic measure indicated in arthritis deformans in children.

The prognosis in uncomplicated cases is good, so far as arrest of the disease is concerned. The deformity and functional disability may persist for a considerable time.

RESPIRATORY DISEASES.

Roentgen Diagnosis of Pneumonia in Infancy and Childhood Without Physical Signs. The question whether a real pneumonia can exist in the chest without physical signs is answered in the affirmative by R. G. Freeman.[5]

Since the adoption of the routine use of the Roentgen ray in hospital cases, pneumonias have been discovered when no physical signs of their existence have been found, and even after their demonstration by Roentgen ray and the determination of the pneumonia, subsequent physical examination has proved entirely negative.

It seems important, therefore, to demonstrate, so far as possible, the existence of such cases without physical signs, in view of the fact that, at the present time, it is often difficult and impossible to obtain satisfactory roentgenograms of sick children in private homes.

There is urgent need of a Roentgen-ray apparatus which can be used in private houses without the great expense at present involved in such Roentgen-ray work.

The author gives the histories of three cases of pneumonia without physical signs.

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(5) Archiv. Pediatrics, January, 1920.

Water Retention in Pneumonia. In all but one of twenty-eight cases of pneumonia H. O. Lusky and H. Friedstein[6] found that there was some loss of weight coincident with the crisis. This loss was frequently quite marked.

The average loss of weight of the uncomplicated cases occurring within twenty-four hours, was 9⅗ ounces. The maximum loss in one day occurred in one case and equaled 1¼ lbs., the minimum was 6 ounces in two days.

The authors were unable to find any relationship between the degree and the rapidity of the loss to either the height of temperature, as registered during the stay in the hospital, or to the duration of the fever. Neither was there a relationship between the range of the drop in temperature and the loss of weight.

In twenty-two cases of pneumonia which did not end in crisis there was no loss of weight with the gradual defervescence in five; when there was a loss of weight it never was abrupt, but extended over a considerable number of days.

The authors believe, therefore, that cases of lobar pneumonia with crisis are more likely to be accompanied by a marked loss of weight coincident with or rather shortly preceding defervescence. Uncomplicated cases of otitis media may show a rather abrupt loss of weight with defervescence, but this seems to be more the exception than the rule.

Several factors may enter in this abrupt loss of weight in cases of pneumonia. It must be taken into consideration that a considerable amount of inflammatory exudate exists with this disease. Its rapid resolution has been shown to be associated with an increase in the amount of urine as well as in the amounts of the excreted chlorides and nitrogen. The absorption and excretion of the inflammatory exudate or of its products may take part in this loss of weight. But this may not be all. Indeed, the occurrence of such abrupt losses of weight in some cases of otitis media shows that the resorption of the exudate can not be the only factor concerned. Part, or even most, of this loss of weight, the authors think, may be due to an elimination, of previously re-

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(6) Amer. Jour. Dis. Child., May, 1920.

tained water. Koeppe, who observed an increase of weight of infants free from nutritional disorders during various febrile attacks, attributed this increase to retention of water.

Abscess of the Lungs in Infants and Children. H. Wessler, and H. Schwarz,[7] had occasion to observe during the past few years fifteen cases of abscess of the lungs in young individuals.

Three of these cases followed aspiration of a foreign body; five cases were subsequent to operation for tonsillectomy and seven cases may be attributed to pneumonia or other inflammatory lung conditions.

The symptoms of acute lung abscess, taking the post-tonsillectomy cases as a type, are as follows: Immediately, or several days after the operation, a distressing persistent cough develops. This is especially harassing at night, but it may also be present throughout the day. With the cough there is usually a rise of temperature. The temperature is fairly constant during the first weeks, with minor fluctuations. Later it may become intermittent, and there may be entire absence of temperature elevation for days. The physical signs of lung involvement are usually slight or absent during the early stages. Later, they may become definite, and the evidences of a cavity may be made out. This is in contradistinction to the adult cases in which the physical signs, even of an extensive process and a large cavity, are usually indefinite.

On the thirteenth or fourteenth day, signs of gangrene are noted, including fetid breath, putrid sputum and hemoptysis. The sputum is then profuse. Club fingers appear very early and disappear after the abscess has healed, sometimes earlier. During the course of the disease, complications, such as perforation of the abscess into the pleura with a resulting empyema or pyopneumothorax, severe hemoptysis or cerebral abscess, may make their appearance.

The further course of cases of abscess of the lung depends on the etiology. A survey of the outcome of more than thirty postoperative abscesses in children and adults shows that in about one-third of the cases re-

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(7) Amer. Jour. Dis. Child., February, 1920.

covery occurs spontaneously. This always takes place within about two months after the onset. An abscess which lasts longer than this is apparently not susceptible of spontaneous cure. These cases go on with periods of improvement and of apparent cure. Sooner or later, however, other abscess cavities form, extensive induration of the lungs develops, other lobes become secondarily infected and, finally, any of the complications mentioned may supervene.

The prognosis is bad in the postpneumonic cases. In few of the cases is recovery spontaneous. Some pursue a course similar to that of the post-tonsillectomy cases. In the others, usually those following influenza or bronchopneumonia, minor symptoms may be manifested for a long time. The lung induration may lead to multiple, thin-walled, cylindric bronchiectases which secrete enormous amounts of purulent sputum. In such cases, in which the disease does not involve the lung parenchyma, the patient may be well for years and suffer no more discomfort than is entailed by the periodic emptying of the numerous bronchiectases. On the other hand, the supervention of anaërobic infection may at any time convert these relatively benign cases into the more severe forms. They may continue over a period of many years.

The Roentgen-ray examination has been of great value, not only for diagnosis, but also for a careful and exact oversight of the progress of these cases. Thus, in view of the frequent remission in the symptoms of acute abscess, great caution must be observed in making any statement in regard to cure. In cases of apparent cure, the Roentgen-ray examination has frequently demonstrated the persistence of a small pneumonic area, which has later been the source of a reinfection of the lung. Of course, the exact localization of the process is of the greatest value to the surgeon who contemplates any operative procedure.

In at least one-third of the postoperative cases recovery occurs spontaneously up to two months, and therefore, it is evident that during this period, all treatment should be palliative and will differ little from that employed in any case of pneumonia. In cases which have persisted beyond this time the question of operative procedure will arise. The extremely distressing cough and nauseating odor of the expectoration make the patients not only a burden to themselves, but to those around them, and any operation that holds out even a small hope of success is eagerly welcomed. In young persons, with their great resistance to operative shock, the very serious operation of lobectomy, in selected cases, has yielded brilliant results, and it is hoped, that with further improvement in the technique of thoracic surgery, this operation may be still further freed from its dangers. Incision and drainage of the abscess offers less hope for permanent cure, although the operation in some cases may result in considerable amelioration of the symptoms.

The authors emphasize that bronchoscopy should be performed in every case of lung abscess for the detection of a foreign body. In children especially, a history of the aspiration of a foreign body may not be obtained, and the Roentgen-ray examination may not disclose it. Thus, on more than one occasion a localized empyema has been traced to a ruptured lung abscess at the base of which a foreign body was found by the bronchoscope. Early removal of such a foreign body may lead to the prompt resolution of a lung abscess if it is not of too long standing.

Infantile Asthma and Asthmatiform Syndromes. J. Comby[8] thinks that true asthma, the essential hereditary type, is very common in children. It is seen even in early infancy, but it is often unrecognized or taken for bronchopneumonia.

The diagnosis of true asthma is based on hereditary history, on the spasmodic character of the attacks, their intermittance or periodicity, the tones of the râles heard at a distance and the rapid termination of even the most alarming outbreaks.

Infantile asthma, according to this author, is in no way connected with tuberculosis. It becomes necessary to distinguish it from the tracheobronchial adenopathy which asthmatiform complications may provoke with severe suffocations. True asthma must also be distinguished from the more or less suffocation dyspneas

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(8) Archiv. de méd. des enfants, July, 1919.

of spasmophilia and hypertrophy of the thymus. These latter manifestations can be grouped in the category of asthmatiform syndromes. The asthma which follows eczema of infancy, however, is considered by the author as a form of true asthma.

Foreign Bodies in the Air and Food Passages. During the past two years E. E. Graham[9] had opportunities of seeing in children a comparatively large number of cases of foreign bodies in the air passages, and a much smaller number of cases of foreign bodies in the food passages. He believes that foreign bodies in the air and food passages in children are much more common than was formerly supposed. Statistics tend to show that about 66 per cent. of cases of foreign bodies in the air passages occur in children.

The period of latency of symptoms which follows the violent dyspnea and choking attack, and later the gradual onset, and chronic character of the symptoms, might lead one to fail to suspect the presence of a foreign body.

The symptoms vary greatly. A peanut kernel immediately sets up a severe laryngitis, tracheitis and bronchitis. In the peanut cases, the older child may survive the acute symptoms, but almost surely will develop pneumonia. Metal objects may remain in the lung for a very long while and do comparatively little damage. There are some foreign bodies that do not cast a shadow on the plate.

The location in the esophagus of a foreign body that does not cast a shadow on the plate may often be diagnosed by allowing the patient to swallow a bismuth-filled capsule. The Roentgen ray shows the location of the bismuth capsule held in position in the esophagus by the foreign body.

The author advises against urging the patient to cough with the hope of expelling the foreign body inhaled in the lungs, because foreign bodies are very rarely coughed up.

The physical signs and symptoms vary according to the composition, form, shape and size of the foreign body. One should suspect a foreign body if the follow-

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(9) Amer. Jour. Dis. Child., February, 1920.

ing conditions are present: an unexplained leukocytosis, localized symptoms in one lung that do not clear up under treatment, no tubercle bacilli in the sputum, and a gradual failure in weight and strength.

There are no contraindications to bronchoscopy except, perhaps, extreme weakness in the patient, when time should be given the individual to rally partially. Bronchoscopy should be performed as soon as possible after the entrance of the foreign body. Children do not require the administration of an anesthetic for the performing of a bronchoscopy.

The necessity of taking a roentgenogram in every case with a history of swallowing or inhaling a foreign body, can not be emphasized too strongly.

The asthmatoid wheeze, when present, is a sign of considerable importance.

HEART DISEASES.

The Circulatory Reactions to Graduated Exercise in Normal Children. From experiments on the circulatory reactions after exercise in twenty normal children, M. G. Wilson[10] concludes that the reactions in normal children are similar to those reported in adults.

The circulatory reactions immediately following similar graduated exercise at two day intervals over a period of weeks are, as a rule, constant. The time required for the pulse rate to return to normal does not give much information as to the "exercise tolerance" of a child.

A type of systolic blood-pressure curve after exercise, showing an increased rise, delayed rise and summit, and a prolonged fall, and associated with symptoms of marked dyspnea and fatigue, would seem to indicate that the "exercise tolerance" of that particular child has been temporarily reached or exceeded.

Significance of Arrythmia in the Infections of Childhood. According to C. B. Farr[1] sinus arrhythmia is of no prognostic significance in diphtheria. Premature

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(10) Amer. Jour. Dis. Child., September, 1920.
(1) New York Med. Jour., Oct. 18, 1919.

contractions are of uncertain significance, but may suggest beginning myocarditis with increased irritability. Heart block of all degrees implies toxic injury or inflammatory infiltration of the conducting fibers. It frequently accounts for the sudden and ominous fall of the pulse rate in diphtheria. These forms of arrhythmia may be variously combined. Auricular fibrillation is rare in diphtheria.

Auricular fibrillation (formerly called nodal rhythm, pulsus irregularis perpetuus, etc.) is the most important of the purely pathologic arrhythmias. It is never to be lightly regarded and is generally of serious prognostic significance. It is common in failing hearts of chronic endocarditis (rheumatic or otherwise) in adolescence and adult life. It is not, however, a frequent finding in diphtheria and other acute infections. In auricular fibrillation the distended auricles do not contract, but quiver rapidly under the influence of a rapidly recurring series of fruitless impulses. The ventricle is unable to respond uniformly to these tumultuous stimuli nor yet to assume its own pace as in heart block. As a result it contracts in a totally irregular fashion, abortive, weak and strong beats succeeding each other rapidly in hopeless confusion without any semblance of fundamental rhythm. If a condition of impaired conduction or heart block is induced by drugs of the digitalis group, the pulse becomes slower and often quite regular, though the condition of the auricles is unchanged. Auricular fibrillation may be temporary as in acute infections (toxic), but is usually permanent and indicates serious myocardial weakness or exhaustion. In diphtheria it may be due to a toxic injury to the myocardium, possibly temporary, or to antecedent cardiac disease.

Pulsus alternans, one of the rarer forms of irregularity, is characterized by alternate strong and weak beats at equal intervals (in contrast to bigeminus) and is indicative of serious myocardial weakness. It has been seldom or never observed in childhood and no cases of this type of arrhythmia have been recorded as occurring in diphtheria.

Auricular flutter, one of the rarer forms of arrhythmia, is characterized by extremely rapid (300-550), though regular, contractions of the auricles which are registered by the electrocardiograph. It is one of the causes of paroxysmal tachycardia. Frequently the ventricles contract at a much slower but regular rate, due to a condition of partial heart block. In other instances auricular fibrillation is simulated. Hume reports one case of paroxysmal tachycardia associated with auricular flutter occurring in diphtheria. In this case recovery followed.

Auriculoventricular Heart Block in Children. A case is described by J. A. E. Eyster and W. S. Middleton[2] of partial auriculoventricular dissociation developing in a child, aged 2 years, apparently associated with an acute nasal and throat infection. This child has been under observation for more than two years. At present, the cardiac condition is that of a well-compensated mitral lesion, associated with a 2: 1 auriculoventricular block with a ventricular rate between 50 and 60. The child has developed normally, is in apparent good health and is normally active.

A search of the literature has revealed twenty reported cases of heart block in children. Nearly all of these were definitely or probably of congenital origin or occurred during the course of severe and usually fatal diphtheria.

DISEASES OF THE NERVOUS SYSTEM.

Obstetrical Paralysis Cause and Treatment. J. W. Sever[3] concludes that obstetrical palsies are due to stretching and tearing of the roots of the brachial plexus. Boys and girls are equally affected. The upper arm type is the most frequent. Both arms are very infrequently affected.

They are practically always associated with a difficult labor involving either forceps or force. They are more frequent in head deliveries, and they may be associated with fracture of the clavicles, but this is rather unusual. He states that it is not the result of posterior

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(2) Amer. Jour. Dis. Child., February, 1920.
(3) Canad. Med. Ass'n. Jour., February, 1920.

dislocation or fracture of the humerus. Prognosis is good in the upper type and bad in the lower.

Werdnig-Hoffmann Paralysis. E. A. Barton, and H. Ingleby,[4] claim that cases of the Werdnig-Hoffmann type of progressive spinal muscular atrophy are rare, less than a score of complete cases being hitherto reported. The disease was described by Werdnig in 1891 and by Hoffmann two years later. The cause is so far unknown, nor is there recorded a case of recovery. Its familial character is extremely marked.

The authors report a case of this disease in a baby 5 months old. The father, a railway porter, has had some weakness of chest, but is not asthmatic. The mother was an only child of her mother, the latter dying of cancer at the age of 31. Neither on father's side nor mother's side could any similar disease be traced, nor was there any family history of syphilis or albinism. Of this pair there were born: First child, male, ten months after marriage, full term, not breast-fed. When about 3 months old the infant "suffered with its chest" and lost the use of the right arm and leg. It had a swelling on the back of the left hand; no nystagmus. The child died, at the age of 6 months, of bronchopneumonia, paralysed on the right side only.

Second child, female, born full term, alive and well at time of writing, aged 9. The child had two "cysts" removed, one from forehead and one from the neck.

Third child, female, alive and well.

Fourth child, female. At age of 3 months she lost the use of both arms. Paralysis increased and the child died of bronchopneumonia at age of 14 months. There was no nystagmus.

Fifth child, male, born dead; mother had accidental hemorrhage.

Sixth child, female, the present patient, 5 months old.

This child was born at full term, was breast-fed to a week prior to admission. The first sign of weakness noticed was pronation of forearms at age of 3 months. Then the child had "an influenzal attack," after which there was a sudden loss of power of both legs, associated with profuse sweating.

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(4) Lancet, Nov. 22, 1919.

The child on admission to hospital was plump, of good color, and well-nourished. There was profuse perspiration. The child's arms were averted and the forearms pronated, so that the backs of the hands were turned toward each other. The legs were flaccid, but moved slightly, the feet more so than the legs. There was no evidence of pain when the child was moved or taken up, though when held erect the head fell limply forward. The muscles of the back seemed more involved than those of the belly, though the chest muscles were so far implicated that expansion was very imperfect, with some recession on inspiration, the breathing being mostly diaphragmatic. The knee-jerks were absent. Pupils were normal. There was definite and pronounced nystagmus, much more marked in the left eye which was involved before the right. Nystagmus was increased markedly when the eyes were turned to the left side.

The fundus was very fair—*i. e.*, deficiency in chorioidal pigment, partial albinism; no macular change, no cherry-red spot as in amaurotic idiocy. A week after admission the neck muscles were obviously more involved, and the child even when crying, lay quite still. The breathing had become almost completely diaphragmatic. The only muscles in which any electrical response could be obtained were the flexors of the limbs. and those showed a slight contraction to galvanism and faradism, but a large current was used. A throat swab was taken and found free of diphtheria; the spinal fluid was normal and sterile. The temperature was normal throughout. The child died a month after admission of bronchopneumonia due to involvement of chest muscles.

Backward, Nervous and Delicate Children: Their Treatment and Management. The anomalies of development formed in backward, nervous and delicate children are, in the opinion of E. B. McCready,[5] due to an underlying hypoplasia originating in causes which may be hereditary, environmental, or a combination of both. The manifestations of organic inferiority are evident at a very early stage in the individual's existence.

The earlier treatment is instituted the more favorable is the prognosis. To be most effective, treatment should

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(5) Penn. Med. Jour., September, 1919.

include all measures, medical, hygienic and educational which have for their purpose the stimulation of the correlative forces of growth, the elimination of waste products, the development of psychomotor and emotional control, and the cultivation and organization of the higher faculties of the mind, all of which measures are included in the term ''pedo-euthenic'' treatment.

Acute Cerebrocerebellar Ataxia. The following conclusions are reached by J. P. C. Griffith,[6] from cases of cerebrocerebellar ataxia reported by him and from those previously collected from medical literature.

There is a condition not common, but more frequent than is ordinarily supposed, in which an acute hemorrhagic encephalitis involves the cerebellum, and which might be designated ''acute cerebellar encephalitis.''

With this are always combined symptoms indicating an involvement of the large brain as well, and the title ''cerebrocerebellar encephalitis,'' or ''cerebrocerebello-bulbar encephalitis,'' is consequently to be preferred. The degree to which the process involves one or another part of the brain varies with the case; in some instances the cerebellar lesions predominating, in others the cerebral; but in all in the category of cerebellar encephalitis there is a combination of the symptoms affecting both regions. In very many more instances the cerebellum escapes entirely, so far as symptoms indicate.

The cause of this cerebrocerebellar encephalitis varies decidedly. In the majority of the cases previously reported in medical literature, some infectious disease had preceded the attack. Among the symptoms most frequently seen are:

Unconsciousness, usually of but short duration.

Ataxia, a constant symptom in all instances.

Affection of speech, shown sometimes as a complete inability to speak which may last for months; in other cases manifestly an ataxia of speech rather than a mental disturbance.

Disturbance of mentality, apart from unconsciousness, is seen in many instances. It is usually temporary, but may be very persistent.

Nystagmus was observed in two of the author's cases,

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(6) Amer. Jour. Dis. Child., August, 1920.

and has been reported in a number of others. It is an interesting confirmatory symptom when it exists, but would appear oftener to be absent.

"Loss of power" is often a very evident symptom, at least in the observation of the families. It is, however, usually absent, and is probably nearly always dependent in reality on an ataxia. In a few instances there has been a decided hypotonia for a time.

Active tendon reflexes are often observed.

Among other symptoms may be mentioned vertigo, which is conspicuous by its absence. However, the early age at which the majority of cases occurred rendered the determination of the existence of vertigo difficult.

The consideration of the prognosis is of interest. So far as life is concerned it would appear to be good.

Of the seventeen cases collected from medical literature complete recovery is known to have taken place in a considerable number, and it is probable that this was true of a number more. So far as statistics go, it would appear that the disease will leave no traces in the majority of instances.

DISEASES OF THE URINARY ORGANS.

Prognosis of Pyelitis in Infancy. From his experience in the Kaiserin Augusta Victoria Hause, E. Rhonheimer[7] concludes that the prognosis of pyelitis in infancy is good, so far as life is concerned. The cases treated in the above-named institution showed a mortality of only 6.5 per cent.

The prognosis of pyelitis in infancy, so far as recovery is concerned, is very good compared to the pyelitis of older children and adults. The usual recurrence of pyelitis observed in older children is rare in infants. It is improbable that the pyelitis of this period leads to complications later in life, such as in menstruation, pregnancy or childbirth.

The pathologic findings in the urine, such as albumin, leukocytes, bacteria and epithelial cells may persist for

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(7) Zeitschr. f. Kinderhlk., vol. 21, 1919.

one year after the acute attack without making the child ill.

The author explains the rare recurrence of pyelitis in infancy as compared to the frequent recurrence of the disease in older children on the ground of the etiologic factor in the two types of the disease. During infancy, the infection is descending from the kidneys to the bladder. The colon bacilli enter the circulation as a result of damage to the intestinal walls from nutritional disturbances, the bacteria being excreted by the kidneys. In favor of this method of infection in infancy are: (1) the frequency of nutritional disturbances, enteral as well as parenteral, preceding pyelitis; (2) the relative frequency of pyelitis in boys. Since nutritional disturbances become less frequent in later infancy, the tendency to recurrence also lessens in the later part of infancy. The pyelitis of older girls and women, on the other hand, occurs by the ascending route from the bladder as a result of cold, menstruation, pregnancy or childbirth. These causes repeat themselves and give rise to a recurrence of pyelitis.

Acute Nephritis in Childhood. An exposition of his experience with acute nephritis is given by L. W. Hill.[8] He divides acute nephritis in children into two groups, according to the clinical picture (1) acute hemorrhagic, and (2) acute exudative.

Acute hemorrhagic nephritis is a type of nephritis, occurring especially in children, although it is seen occasionally in adults. Its chief characteristic is a very bloody urine containing very few casts. The urine is not diminished in amount, and usually there is no edema. The various tests for renal function generally show a moderate impairment of kidney efficiency, but never the severe impairment that is often seen in the edematous cases with scanty urine containing many casts. The blood-pressure is occasionally somewhat elevated, the highest Hill has ever seen being 140 mm. of mercury, but it is more likely to be normal than high. The subjective symptoms are insignificant, the author having seen no uremia in this type of nephritis. The urine usually contains blood for from six to twelve weeks, and

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(8) Jour. Amer. Med. Ass'n., Dec. 6, 1919.

in many cases may contain microscopic blood over a period of several months. Occasionally, a urine which shows no albumin will show a considerable number of blood cells in the sediment when examined microscopically. The prognosis is, as a rule, good, the author having seen no fatal case. Usually the process clears up entirely and leaves a perfectly good kidney behind it, but in a few cases chronic nephritis develops.

The second type of acute nephritis, which the author calls "acute exudative," presents a somewhat different picture. Edema is usually marked, and is sometimes extreme in degree. The urine output is very scanty during the early stages, and as the kidney begins to recover there is polyuria. The urine is likely to be brownish red, with a heavy sediment of disintegrated blood, and contains a large amount of albumin. Microscopically, it shows large numbers of granular or cellular casts, and considerable numbers of blood cells. The child is likely to become more ill in this type of nephritis than in the acute hemorrhagic type. The blood-pressure is usually elevated, there may be headache and convulsions, and occasionally a patient dies of uremia. The renal function tests, as a rule, indicate considerable impairment of kidney efficiency. Most patients recover, however, and usually without the development of chronic nephritis. Two patients out of twenty-four with this type died during the acute stage.

In the author's series of forty-nine cases of acute nephritis there were twenty-five of the "hemorrhagic" and twenty-four of the "exudative" type. In most of the hemorrhagic cases, tonsillitis was the etiologic agent, as it was also in the "exudative" cases; but far more of the exudative cases were of unknown etiology than were cases of the "hemorrhagic" type.

The author outlines the following treatment:

It is especially important to keep a child with acute nephritis warm. Bathing and proper care of the bowels are of great importance. In the cases without edema the author uses licorice powder as a laxative and in those with edema, when free watery catharsis is desired, magnesium sulphate. Diuretics play a very small part in the treatment of acute nephritis, and most authorities are agreed that the stronger diuretics, such as the caffeine derivatives, may do more harm than good in this condition. There is no objection, however, to giving such mild diuretics as potassium citrate or cream of tartar. Iron is always indicated in acute nephritis of any type, as there is a considerable daily loss of blood in the urine, and anemia rapidly develops. The author uses the hot pack, or hot air bath, to promote sweating in a few cases with extreme edema, but in the majority of patients the edema can be controlled by dietary measures and purgation. In severe cases, the hot air bath is used as an adjunct to these. Drugs, with the exception of laxatives and cathartics, are of comparatively small value in acute nephritis; far more important is the general care of the patient, particularly as regards the diet and the water intake.

In acute nephritis where we are dealing with acutely inflamed kidneys, it should be the aim, in accordance with general therapeutic principles, to rest the irritated organs as much as possible, and to protect them from the irritating end-products of metabolism. Food-stuffs may be divided into four groups: fat, carbohydrates, protein and salts. The fats and carbohydrates are not excreted through the kidneys, but are burned in the body; therefore, free administration of fat and carbohydrate is permissible in acute nephritis. The kidneys' chief function is to excrete the end-products of protein metabolism and some of the salts, particularly sodium chloride. Consequently, in any dietary measure designed to spare the kidney, it is necessary to consider these two substances.

It is not desirable to put a patient with acute nephritis on a strictly protein-free diet, which would probably do him more harm than good, as a certain amount of protein is necessary to repair the wear and tear of body tissue, and to keep the patient in nitrogenous equilibrium. Not a great deal is known of the exact protein requirements of children, but probably the old figure of from 1.5 to 2 gm. protein per kilogram of body weight is near enough to the actual requirement for practical purposes. The child should have, then, not more than 2 gm. of protein per kilogram of body weight. For practical purposes, in many cases, it is quite sufficient to omit meat, eggs and fish and meat soups from the diet, and to make it up of cream, milk, cereals, bread, potato, etc.

Salt: In the cases without edema, it is quite sufficient to prohibit any salt cellar on the tray. The bread and butter do not need to be salt-free, nor is it necessary to omit salt when cooking the vegetables and cereals. In the edematous cases, a more rigid salt restriction is necessary, as the most generally accepted view of edema in acute nephritis is that it is brought about by a primary salt retention with secondary water retention. In this group of cases, the butter should be unsalted, and the bread, cereals and vegetables should be cooked without salt. Such a diet is called a "salt-free" diet, but the designation is not strictly accurate, as most of the ordinary foodstuffs contain a small amount of salt. This is not enough, however, to do any harm. The employment of a "salt-free" diet is one of the most effective methods of getting rid of nephritic edema, especially when its use is combined with free catharsis and fluid restriction.

Water: In the non-edematous cases no restriction of water is necessary, and indeed it is desirable to give a reasonably large amount of water, as it helps in diluting and eliminating toxins. In these cases, the kidney is usually able to handle water, and about 48 ounces of fluid a day is what the patients should take. If the urinary output becomes much less than about two-thirds of the intake, and the patient begins to gain in weight, the amount of water should be reduced.

The edematous patients need to be restricted considerably as regards the fluid intake. It is rarely advisable to try to give less than 12 ounces of fluid a day, as there is too much suffering from thirst. Most children in ordinary weather, can get along very well for a limited period of time on from 16 to 20 ounces of fluid a day. If the patient handles water well, and there is no increase in weight or edema, the fluid intake may be gradually raised. It is important to weigh these patients every day, as often there will be an increase in weight, due to "waterlogging," that is not apparent on the surface of the body. It is also important to keep a daily record of the fluid intake and output, and to observe closely their relationship.

Traumatic Stricture of the Urethra in Children. A. R. Thompson[9] finds that traumatic strictures follow upon ruptured urethra in young subjects.

Suprapubic cystotomy is strongly recommended by this author as a routine procedure which greatly assists the adequate treatment of ruptured urethra.

The prognosis of traumatic stricture is very grave.

Treatment by catheterization may be performed, but this may fail and excision of the stricture be called for.

The important principles in an operation for excision of a stricture are preservation of an intact urethra; removal of as much fibrous tissue as possible; and deep burial in surrounding structures of the sutured urethra.

DISEASES OF THE DUCTLESS GLANDS.

Enlarged Thymus: Symptoms and Treatment. After discussing the function of the thymus, E. R. Brooks[1] discusses the diagnosis and treatment of enlarged thymus.

The diagnosis of enlarged thymus is often quite difficult and is, no doubt, met with much oftener than it is recognized. There are three means to aid us in making the diagnosis.

First, are the objective symptoms. Usually a well-nourished child is seen, which gives a history of difficulty in breathing, a condition which may be constant or may come on in paroxysms, especially during a crying spell or fit of anger.

There is an inspiratory stridor and also some expiratory difficulty in breathing; the head is held back, although this only aggravates the trouble, and usually more or less cyanosis is present.

Retraction of the episternal notch and also the epigastrium is observed, indicating apparently a mechanical obstruction. The cry is rather hoarse and in severe

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(9) Brit. Jour. Child. Dis., June, 1920.
(1) Ohio State Med. Jour., January, 1920.

cases the child presents a very alarming appearance. There is often a history of convulsions following the attacks of dyspnea.

On percussion, usually slight dullness can be detected, extending either to the right or left of the sternum, but often nothing can be ascertained by the most careful percussion. The best method of percussion is that called by Sylvester and others the "Threshold Method of Percussion." The child is placed on its back on the mother's lap. Percussion is begun well out in the chest with such light strokes, that when the ear is within a few inches of the area under percussion, only the faintest possible resonance is heard. When sounds disappear, dullness begins. This may be confirmed by the sense of tactile resistance.

The lower border is difficult to outline, as it shades into the heart dullness, but it is not essential for purposes of diagnosis that this border be ascertained.

The *x*-ray is our most valuable means of diagnosis of an enlarged thymus, but here again extreme care must be exercised in getting the picture, as a slight tilting of the chest to one side or the other, will disarrange the mediastinal organs, blurring the edges of the plate and preventing a proper interpretation of the shadows. The technique followed by Lange has given very good results. He lays the child flat on its back, being careful that there is no lateral tilting. With a soft tube, a very short exposure is made, as one over 1/30 of a second is almost sure to have the edges so blurred as to be of no value.

The treatment of enlarged thymus is still uncertain. Different methods of treatment of an enlarged thymus causing symptoms have been tried. At first thymopexy was used with very poor results. Intubation did no good, as the point of compression was below the reach of the tube.

Thymectomy gave great relief in a number of cases, with a mortality of about 11 per cent., but the operation is a serious one and should, therefore, be advised only in severe cases.

Friedlander was the first to treat this condition by the use of the *x*-ray and the results in many cases have been nothing short of marvelous. At first, difficulty was encountered in regulating dosage, because of the limited knowledge of the use of the x-ray, but at the present time, the dosage can be accurately estimated and the results are most gratifying. Improvement in the most alarming cases is often obtained in from eighteen to forty-eight hours, with sometimes almost total abatement of symptoms which have existed for months.

The treatments in the average case are given at intervals of a week, and from three to six treatments are given, the child being kept under observation and brought in later for subsequent exposures, if necessary.

In urgent cases, full doses should be given, repeated in three or four days, the child being kept under close observation, so that the unfortunate accident of sudden death during the treatment may not occur.

In cases of asthma in which no enlargement of the gland can be demonstrated, the therapeutic test of x-ray treatment should be given and a most gratifying result will very often be obtained.

Organotherapy has been tried with very poor results as we know so little about the functions of the gland. Brooks reports two cases of enlarged thymus that came under his observation.

DISEASES OF THE SKIN.

Etiologic and Histologic Study of Erythema Nodosum. The clinical histories of seven cases of erythema nodosum in children are given by C. Pestalozza.[2]

The previous history, and clinical and biologic findings in these cases lead the author to believe that erythema nodosum is tuberculous in nature. Although the histologic findings do not prove this hypothesis they do not offer anything opposed to it; or anything contradictory to the statement that erythema nodosum is the exponent of a tuberculous state already initiated which may run latently and only be brought in evidence by a cutaneous reaction.

There still remains the question: Why, in spite of the

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(2) Pediatria, July, 1919.

frequency of tuberculosis, is erythema nodosum a relatively rare phenomenon?

In the author's clinic, of 746 babies, showing tuberculous affections, only seven showed erythema nodosum, or 1.06 per cent. It is obvious, that if tuberculosis is the etiologic factor, there must be some other determining factors to provoke the outbreak of an erythematous eruption. The author can not at present define these causes definitely, but he believes that there is some disturbance in the blood circulation, which makes it possible for the tuberculous toxins circulating in the blood to give rise to the erythematous nodules. In favor of such an explanation is the observation that erythema nodosum is manifested with special frequency in the lowest parts of the body, in which, owing to special causes a slowing in the circulation of the blood is manifested.

The Predominance of Seborrheic Eczema in Early Life. It has been the experience of T. S. Southworth,[3] that predominance of the cases of eczema presenting themselves in the ordinary routine of pediatric practice are associated with seborrhea, many of which are mild and would rarely reach the dermatologic specialist. The prevalence of milder types led him to examine the severer eczemas with a view to determining the presence of seborrheic manifestations and he found them frequently present.

The clue to such basic causation is found about the ears as well as on the scalp. To trace the seborrheic factor it is necessary to begin with the milder forms on the face and body whose identity may be established by finding seborrhea on the scalp and in the characteristic location in the folds above and below the ear. In such cases, if the condition of the scalp does not permit of an exact diagnosis, inquiry will usually elicit the information that the "milk" crust or "cradle cap" persisted unusually long and was eliminated with some difficulty.

The ear sign may vary from a mere adherent dry exfoliation to a moist and exuding surface where two surfaces are in contact, either above, where the pinna

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(3) Archiv. Pediatrics, June, 1920.

joins the hairy scalp, or below at the juncture of the lobe of the ear with the upper part of the neck. When marked, and with some severe eczemas, the moist surface may invade considerable portions of the sulcus behind the ear.

There is something significant also in the predilection of such eczemas for fat babies fed on breast milk rich in fat, and for bottle babies suffering from disordered digestion caused by a relatively excessive intake of fat. In both groups of infants, we might expect the fat glands of the skin to be more readily subjected to seborrheic disturbance. Towle and Talbot, in their description of cases of eczema associated with faulty digestion of fat, noted the tendency of the exudative eruption to remain limited to the regions of the head for an appreciable length of time, even for months. Many cases, in fact, showed no tendency to spread to other parts.

Impetigo Contagiosa in Infancy. So-called pemphigus neonatorum, pemphigoid of the new born and impetigo contagiosa bullosa, are considered by J. L. Murray[4] as one disease.

In the cases cited by the author, when the disease was communicated to adults or older children its behavior was that of impetigo contagiosa of the common type.

The difference in symptomatology between the adult and the child, the author believes, is merely due to the difference in soil, the skin of very young or premature infants being particularly vulnerable and non-resistant to this infection.

The malignant type as seen by the author in several epidemics is very fatal in infancy, especially to the new-born. Its onset resembles the mild type, but it progresses so rapidly that within twenty-four hours a child so afflicted will exhibit all the symptoms of a general septic state preceding death.

It is about the most contagious disease to which an infant is subject. Auto-inoculability, bleb formation with exfoliation of outer layers of epidermis like that observed in superficial burns, communicability and rapid progress are the features to be observed in this infection. The mortality in the various epidemics varies from 10

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(4) Ohio Med. Jour., September, 1919.

to 30 per cent., with the higher death rates usually seen in the first four or five days of life.

Nothing except a staphylococcus was found in cases examined by the author.

Removal of the undermined skin and the application of silver nitrate solution, preferably 10 per cent., will arrest the disease immediately according to Murray's experience.

Mongolian Spots in European Children. From a review of his own work and that of other authors, J. Comby[5] concludes that Mongolian spots occur in from 80 to 90 per cent. of the infants of the Mongolian race (Mongols, Chinese, Japanese, Javanese and Eskimos), and in from 2 to 3 per cent. of European children. Mongolian spots are also common among children who have both Mongolian and negro blood.

The spots are congenital, appearing sometimes immediately after birth and persisting to the age of from 5 to 7 years. They then disappear spontaneously. The author saw only one case of a boy in whom the Mongolian spots persisted to the age of 13; the boy was of Jewish origin.

Mongolian spots in children of the Caucasian race are nearly always limited to those of the brunette type, and those whose parents are brunettes. It is never found among blonds or red-haired people.

The location of the spots is usually over the sacral and lumbar region. They may, however, occur anywhere over the body.

The spots are blue or gray in color and, as a rule, are uniform in shade. Occasionally, however, the center is of a deeper shade than the periphery. The color does not disappear upon pressure. The contour of the spots is generally round and regular, though sometimes it is asymetrical.

The microscopic examination of the spots, made by various authors shows the presence of large cells containing black pigment in the deeper layers of the skin. As the pigment crosses the dermic layer it reflects a blue or gray color. When the pigment lies in the cells of the epidermis it is entirely black.

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(5) Archiv. de méd. des enfants, June, 1920.

Comby attaches no clinical importance to Mongolian spots. Some parents do not even notice the presence of the spots; others do but know that they are of no importance. It is at times necessary, however, to differentiate the Mongolian spots from skin lesions, such as ecchymosis, purpurs and nevi. The differentiation is simple. Mongolian idiocy characterized by Mongolian facies and idiocy have nothing in common with Mongolian spots. Mongolian idiots have no Mongolian spots and children with Mongolian spots are mentally normal.

Since Mongolian spots cause no suffering and since they disappear spontaneously there is no need of instituting any special treatment for them.

THE BLOOD.

Appearance of Isoagglutinins in Infants and Children. The isoagglutination reaction of 131 infants and children from birth to 10½ years of age was examined by W. M. Happ,[6] who tested their serum and washed corpuscles microscopically against the serum and corpuscles of each of four adult groups.

He found that the grouping as present in adults is rarely present in blood from the umbilical cord.

At birth and during the first month of life isoagglutination is rarely present, but the percentage of infants in whom the isoagglutinin group is established increases with age, so that after one year the group is usually established, and after two years is always present as in adults.

The grouping is established in the corpuscles before it is established in the serum; *i. e.*, the corpuscles acquire agglutinophilic receptors before the serum acquires agglutinin. Therefore, Group I is the first group to be formed and Group IV is the last.

The early grouping in the corpuscles before the group is established in the serum is liable to change by the acquisition of new receptors. When the grouping has been established in both serum and corpuscles it does not change.

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(6) Jour. Exper. Med., March, 1920.

Isoagglutinins are present in mother's milk and the grouping is identical with that in the mother's blood. These agglutinins are probably not transmitted to the nursing infant through the milk.

The author believes that on account of the differences between the agglutination reactions in the blood of mother and child it is not safe to transfuse an infant from its mother without making the preliminary tests.

Blood-Sugar Curve. A. Frank and L. Mehlhorn[7] found that feeding small children large amounts of cane sugar produces a hyperglycemia of great intensity. The hyperglycemia reaches its climax after one hour, and then subsides irregularly. In most cases there is a secondary rise in the sugar curve and then the blood sugar returns to normal.

Starch produces the same type of blood-sugar curve as does cane sugar, but the return to normal is less irregular and does not produce a secondary rise in the blood-sugar curve.

The authors were unable to feed children dextrose and levulose in large doses.

Feeding with casein and fat had no influence on the blood sugar curve. There was a glycosuria with every type of sugar fed. Starch produced no glycosuria except in one pathologic case. The difference between sugar and starch in relation to glycosuria is explained by the authors on the ground of a specific action of starch that makes the kidneys less permeable.

Relation Between Concentration of Food and Concentration of Blood. W. Wimberger[8] made determinations of the concentration of blood and its relation to the body weight and intake of fluid. He found that the concentration of blood remained quite constant in spite of the variations in the intake of fluid, and that the solid tissues of the body regulated the water balance.

Chemical Examination of the Blood in Children. Chemical blood observations are reported by H. D. Chapin and V. C. Myers[9] on 149 children, thirty-eight of whom were nephritics and six diabetics. In general, the results obtained are quite similar to those obtained

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(7) Jahrbuch f. Kinderhlk., vol. 91, Nov. 5, 1920.
(8) Zeitschr. f. Kinderhlk., vol. 25, May, 1920.
(9) Amer. Jour. Dis. Child., December, 1919.

in the adult, although the kidneys of the child would appear to act somewhat more efficiently than those of the adult, resulting in slightly lower normal figures for the sugar, urea, creatinin and uric acid, and a slightly better phenolsulphonephthalein output.

In harmony with this, nephritis in children does not so quickly result in urea retention as in the adult, making the prognosis more favorable in early than in later life. As might be expected, creatinin retention rarely occurs in children, being found in four of the author's patients, two of whom died with symptoms typical of interstitial nephritis. The authors regard the blood urea as an especially helpful prognostic test in the pephritis occurring in children. The result of phenolsulphonephthalein tests harmonizes very well with the clinical findings and the blood urea.

The authors believe that the carbon-dioxide combining power of the blood is a very reliable method of ascertaining the severity of the acidosis found in the diarrheas of infancy.

The reported blood findings in six diabetic children do not differ from similar observations in adults.

Diabetes in Infancy and Childhood. In scanning the literature, I. A. Abt[1] says, one is impressed by the fact that no extensive clinical studies have been made on the diabetes of infancy and childhood, and consequently no valuable contributions have emanated from this source. Many interesting clinical reports have been made, though they tend more to confirm the general knowledge of diabetes than to shed any new light on the subject. The literature of diabetes is replete with experimental studies on animals. In candor, however, it should be stated that the experimental results fail to explain fully the clinical manifestations in man.

From clinical studies we know that glycosuria in children occurs in a variety of conditions. Glycosuria has been observed in the new-born. Hoeniger observed several times that infants delivered with forceps showed sugar in the urine for three or four days, which gradually diminished. In contradistinction to this he found that children who were born after long labor remained

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(1) Endocrinology, July to September, 1919.

free from sugar. This led him to believe that the trauma inflicted by the application of the forceps was sufficient to induce glycosuria. There are no statistics, however, to indicate the frequency of this occurrence.

In premature babies, lactose is sometimes found in the urine. Glycosuria occasionally occurs in alimentary intoxication and shows its presence in the form of lactose and galactose.

In addition to the alimentary origin, sugar is found in the urine in organic disorders of the liver, acute infectious diseases of infancy and organic brain diseases. In syphilis, scarlet fever, enteritis, chronic enterocolitis and other infections, a transitory glycosuria has been observed. In chronic illnesses sugar may be present.

Injection of potassium, calcium or normal salt solution hypodermically not infrequently produces glycosuria in babies.

True diabetes mellitus in children usually assumes a severe and progressive type of disease characterized by constant sugar production in the urine; hyperglycemia, acetone and diacetic acid are frequently present. The patient is profoundly affected, and the course of the disease, as a rule, is brief.

Concerning the age of occurrence, it is to be noted that boys in the first five years are much more frequently affected. A study of statistics would indicate that boys are more frequently affected in the first five years and that both sexes show an equal frequency from five to ten years. The peculiar circumstance has been remarked that in families in which several generations have been so affected, the patients are younger the more advanced the generation. The author's experience would indicate that the predilection for diabetes is not manifest in Jewish children. It would seem more than coincidence that he has seen from seven to eight non-Jewish children with diabetes to one Jewish child. Heredity undoubtedly has an influence on the occurrence of diabetes in children, though the author's own observations extending over a period of years would seem to indicate that only an occasional case shows a definite hereditary influence.

It has been known for some time that a relation seems to exist between trauma and transitory glycosuria. Diabetes in children has followed severe trauma not only to the head, but to the muscles and abdomen as well.

Infectious diseases are recorded as an exciting cause of diabetes. Numerous authors suggest the possibility of the acute infectious diseases as an etiologic factor. von Noorden conceives the possibility of a lesion of the pancreas in many of the acute infectious diseases, such as angina, influenza, measles and scarlet fever. Connective tissue changes occur in many of these diseases as well as the alimentary disturbances. This view of the cause of diabetes, no matter how attractive it may be, lacks clinical and pathologic basis

The fetus and infant are variously affected by maternal diabetes. The disease in the mother is most frequently disastrous to the fetus. Premature labor with dead or macerated fetuses is a common occurrence. Naunyn says that there is no well-authenticated case on record in which a mother gave birth to a diabetic child. This is not to say, however, that surviving children do not become diabetic in infancy.

The symptoms of diabetes in children are almost identical with those in adults, such as loss in weight and strength, fatigue upon slight exertion, increased appetite, polydypsia, and polyuria. Enuresis is not an infrequent symptom. Urticaria, pruritis and eczema occur as well as furunculosis. The teeth decay early, and stomatitis is not uncommon. Edema about the face and ankles has been observed in advanced cases. Headache, backache and radiating pains in the extremities are sometimes seen. Particularly characteristic are pains in the calf muscles. The urine contains sugar, at times acetone and diacetic acid, and not infrequently albumin and casts. Morse mentions as an early and conspicuous symptom irritation of the external genitalia. He also describes polyuria as the first symptom in five of seventeen patients over 2 years of age, although eventually it occurred in all.

Diabetes in children may begin in a mild or severe form, though it must be observed that the transition from the mild to the severe form occurs more rapidly than in adults. In some cases, the disease has not been recognized until after this transition has occurred. Some children seem to improve after the sugar tolerance has been regulated and the urinary sugar kept low. They attend school and seem to progress favorably in their studies. At times they gain in weight. The temperature is inclined to be subnormal. When the glycosuria has disappeared none of the children loses the tendency toward it. Sugar returns on the slightest provocation. It reappears following psychic disturbances such as disappointment about a journey or a bad school report. Sugar also tends to return following coryza, parotitis, pharyngitis and diarrhea. In most cases the frequent recrudescences tend gradually to reduce permanently the level of tolerance. In consequence of this fact infections of the upper respiratory tract or other infections have an ominous significance and tend to produce complications in diabetic children. In three of Kleinschmidt's cases measles had a decidedly unfavorable effect. In one the disease was first discovered after the measles. In a case reported by Naunyn varicella entailed fatal acidosis, and in Starck's case whooping cough had the same effect. In one of Kleinschmidt's cases a girl of 7 suffered a severe hemorrhagic nephritis without return of the diabetes. This child had a suppurating skin infection besides the diabetes.

Blood-Pressure Curve after Adrenalin Injections in Children. E. Schiff and B. Epstein[2] determined the blood-pressure of thirty-two children, at intervals of 5, 10, 20, and 30 minutes after the subcutaneous injections of 0.5 cc. of 1 per cent. adrenalin. They used the Recklinghaus tonometer for the blood-pressure determination.

They found that in children with a good quality of the pulse, the blood-pressure was raised appreciably, irrespective of the posture of the child. In pale children with a pulse of poor quality without demonstrable vasolability, adrenalin produced no increase or only a slight increase in the blood-pressure. In the reclining position, the blood-pressure was found to rise from 20 to 30 cm. of water. The authors believe that the vasomotor innervation of the blood-vessels and the general lower quality of the blood-vessels are responsible for this.

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(2) Jahrbuch f. Kinderhlk., vol. 91, Nov. 2, 1920.

In pale children with a pulse of low quality and low tension but vaso-stability, adrenalin injection produced a prompt but slight rise in the blood-pressure irrespective of change of posture.

The Chloride Content of the Blood Serum in Infants. K. Scheer[3] found the amount of chlorides in the blood serum of infants to be between 0.505 per cent. and 0.595 per cent. The chloride content of the blood is dependent in great measure on gastric digestion. At the beginning of digestion, with the production of hydrochloric acid, the chlorides of the blood become lower and rise gradually with the emptying of the stomach.

TUBERCULOSIS.

Tuberculosis of Infants, Acquired in a Hospital. P. Nobecourt and I. Paraf[4] give clinical histories of two cases of tuberculosis acquired by infants in the *crèche* attached to the Paris Maternity. The first symptoms did not appear till 6 months and 12 months of age respectively. Clinical diagnosis was established in both cases.

Congenital tuberculosis could be excluded, as both mothers were accepted as nurses in the *crèche* and were healthy in every way.

Infection by milk could also be excluded as both infants were nursed by their mothers.

The only cause left for the infection appears to be that of the surroundings in which the infants lived. Such can be either direct or indirect. Direct infection could be traced to a nurse or attendant with open pulmonary tuberculosis. Such a person is surrounded by an atmosphere which may be contagious for a radius of 1.5 meters. Indirect infection, however, may be the cause. The *crèche* was probably contaminated by the Koch bacillus possibly from tuberculous children who were previously cared for. Such cases may not always be apparent. Bertheramd cites eleven cases of infants under 2 years who harbored tubercle bacilli as was

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(3) Jahrbuch f. Kinderhlk., vol. 91, Nov. 5, 1920.
(4) Archiv. de méd. des enfants, July, 1919.

proved by examination of the fasting stomach contents. Such children may be disseminators of tubercle bacilli either by mouth or by feces. Healthy infants who move or who are carried about the *crèche* are more exposed to infection than the sick ones who lie in their cradles.

Institutional tuberculosis is only one example of the part played by the "hospital atmosphere" in the infectious diseases of infants.

Latent Tuberculosis of Young Children. L. M. Spoverini[5] finds that according to the reports of several authors the incidence of tuberculosis in very young children, *i. e.,* those under one year of age, varies from nothing to 17 per cent.

In his own clinical researches the biologic tests made on 900 infants gave a positive reaction in sixty-three or 7 per cent. of the cases. Of the eight infants from 3 to 4 months of age, 0.80 were positive. Of the twenty-two at from 4 to 6 months, 2.44 per cent. were positive and of the thirty-three from 6 to 12 months 3.66 per cent. were positive.

The facts at Spoverini's disposal lead him to conclude that the infant is not born tuberculous, but that it becomes so by contagion after birth. This contagion is especially familial.

Pluriparity of the mothers seems to be a predisposing cause as regards the resistance of their offspring to tuberculosis. Thus of the cases with positive reaction, 14.28 per cent. were the children of primiparae, while 55.5 per cent. were the children of pluriparae. The majority of mothers of tuberculous children were between 20 and 30 years old.

Infantile tuberculosis is avoidable if the infant is removed from the infected surroundings. The percentage of infants becoming tuberculous increases rapidly with age. Therefore, in order that the segregation of such children should be effective it should be done at the earliest possible time.

The author says it is necessary to seek out the infants born in infected surroundings. They should be collected and placed in nursling institutions in the open country

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(5) Riv. di Clin. Pediatrica, April, 1919.

under constant medical supervision with the guarantee of good natural nourishment.

Primary Pulmonary Tuberculosis in Children. R. G. Canti[6] studied a series of eighty-four autopsies in children up to 10 years of age, with a view of determining whether Ghon's claim of primary lung focus in children can be substantiated. The author reviews Ghon's work claiming that there is a special form of tuberculosis in children consisting of a primary lung focus caused by inhalation of tubercle bacilli. This focus, it is thought, is responsible for the greater number of deaths from tuberculosis in children and easily escapes clinical diagnosis. Ghon found that 92 per cent. of nearly 200 children with tuberculosis had primary foci in the lung. He states that the focus was small, varying in size from a pin's head to a cherry, but most often it was the size of a cherry. In 72 per cent. of cases the lesion was single and rarely were there more than two or three. It is supposed that the lesion begins in the lymphoid tissue surrounding the bronchi, because a fissure is frequently found in the middle of the lesion which represents the remains of a small bronchus and because on tracing distally along a bronchus a dead end is often found in the middle of a focus and the tissue beyond is atelectatic.

The process begins as a small tubercle which increases in size involving the neighboring structures. Small anatomic tubercles often surround the lesion and fibrous tissue may be present in an attempt to encapsulate the area. Caseation may occur in the larger lesions, and occasionally a cavity is formed. Fibrosis or calcification may arrest the process.

The focus is usually just under the pleura which is frequently involved. Where only one lung focus is found the order of frequency is as follows:

Right Upper Lobe	31 per cent.
Left Upper Lobe	23 per cent.
Right Lower Lobe	22 per cent.
Left Lower Lobe	16 per cent.
Right Middle Lobe	8 per cent.

The lesions are scarcely ever apical. The commonest site is the upper lobes in the middle of the anterior sur-

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(6) Quart. Jour. Med., October, 1919.

face. In the lower lobes the posterior surface near the lower edge is most frequently affected.

Ghon classifies the mediastinal glands for purposes of tuberculosis study into these groups.

- Superior tracheobronchial:
  - In the angle between the trachea and bronchus bilateral.
  - Receive largely the drainage from the upper lobes.
- Inferior tracheobronchial:
  - In the bifurcation of the trachea.
  - Drainage from the lymphatics from the middle and lower portions of the lung.
- Paratracheal:
  - Forming a chain on either side of the trachea.
- Bronchopulmonary:
  - Hilus of the lung and between the main branches of the bronchi.

From anatomic observations it has been found that the superficial and deep lymphatic vessels discharge their contents into the bronchopulmonary glands first and then into the remaining groups which are closely connected by anastamosing vessels. Crossing over the midline often takes place in the drainage into the superior tracheobronchial glands.

Two facts concerning the relation of lung to gland tuberculosis stand out. Wherever there is a lung focus there is a gland involvement. Ghon found only one case out of 170 with no demonstrable gland area. Wherever there is a gland focus there is a lung involvement. He found only seven out of 170 cases which did not conform to rule.

An interesting circumstance is the fact that the lung focus is of the same age or older than the gland focus. The infection of the glands follows the lymphatic drainage. A focus in the right upper lobe involves first the bronchopulmonary glands, then the right superior tracheobronchial group. By anastamosis the infection spreads to neighboring groups, first the right paratracheal and the inferior tracheobronchial and later the left superior tracheobronchial group. A lesion in any other part of the lung will be accompanied by a similar spreading out of the glands in the form of a fan, the focus being found at the handle of the fan, or center of the circle.

That the pulmonary infection precedes the glandular involvement is indicated by these facts: Those glands are infected which one would predict from a knowledge of the lymph drainage and the location of the lung focus. The changes in the gland always appear of more recent date. Tuberculous glands of the mediastinum are rarely found without a corresponding lesion in the lung. It would be difficult to conceive why a focus should select a rather remote point in the lung after beginning in a mediastinal gland. The fact that the gland lesion is of greater size than the lung focus does not contradict the priority of the lung focus because the gland is designed to hypertrophy to cope with infection.

That the lung affection is usually primary is shown by Ghon's figures that in only about 9 per cent. could foci be demonstrated in other parts than the lungs. These were not older than the lung foci. In addition metastases were not greatly in evidence as 73 per cent. showed only one focus in the lung.

Where strong anatomic evidence existed that the respiratory tract was the channel of infection forty-three out of forty-four cases were found to yield the human type of tubercle bacilli showing that the infection was air-borne from sputum which contains the human type. The bovine type is found where anatomic evidence is at hand to show the alimentary origin of the infection. This comes by way of ingestion of infected milk.

In the series that Canti reports, sixteen out of eighty-four (19 per cent.) autopsies showed tuberculous lesions. The lung focus was most often the size of a pea although in one case it was as large as a cherry. His findings agree substantially with those of Ghon.

The outstanding features were as follows:

There was an almost constant finding of a lung focus when tuberculous mediastinal glands were found, and there was a close anatomic relation of those glands to the lung focus. The lesion was frequently single.

Tuberculous mediastinal glands were constantly found when a lung focus was present.

When the portal of entry appeared to be elsewhere the lung focus was almost constantly absent.

When a lung focus was found there was almost constant absence of evidence that the portal of entry was elsewhere.

Canti believes that these observations especially when taken in conjunction with the bacteriologic findings of F. Eastwood and A. S. Griffith as to the distribution of human and bovine tubercle bacilli constitute strong evidence in favor of the common existence of primary pulmonary tuberculosis in children.

SYPHILIS.

Congenital Syphilitic Debility. A report of cases of latent hereditary syphilis is given by A. Lesage and Kouriansky.[1] Their cases were characterized by debility or atrophy appearing in the early months. According to the authors, the Wassermann test gives the best result in infants. It should be repeated several times at intervals. It may be positive in the mother and negative in the child; but if the child is debilitated and atrophic syphilis may be suspected. Latent syphilis with negative Wassermann reaction may be ''activated'' by a dose of salvarsan.

The prognosis of atrophic and debilitated cases with positive Wassermann is bad, eleven deaths in thirty cases having occurred in Barbier's series.

The authors' researches and observations show that syphilis is present in from 25 to 35 per cent. of debilitated infants. Specific treatment has substantiated this; 90 per cent. of syphilitic atrophy is of the soft type, normal ossification is retarded. Atrophy may of course be due to other affections such as tuberculosis.

The authors have treated their cases by neosalvarsan injections. They prefer to use the veins of the neck, only very exceptionally using the longitudinal sinus. They commence with 0.25 cgm. repeated every eight

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(1) Nourrisson, July, 1919.

days; by degrees it is raised to 0.33 cgm. to 0.5 cgm. and to 1 cgm. The weight of the child in kilograms is not used by them as a basis for the dosage. After six or seven injections a period of rest of two months is allowed and new injections started. The treatment can be begun right after birth. The therapeutic results are excellent.

Syphilitic Ulcer of the Umbilicus in an Infant. Small ulceration in the umbilical region was noticed by P. Nobecourt and I. Paraf.[2] This child had been born prematurely and was 36 days old when first seen by the authors. It weighed 2500 gr. and was thin and athrepsic; it vomited and had yellow-green stools but no fever.

The ulceration progressed rapidly; there was some cough and mucopurulent coryza. The blood Wassermann was positive; the cutaneous reaction was negative. The mother gave a strong positive Wassermann. The ulceration increased in size and weight diminished. Novarsenbenzol and mercurial treatment was instituted. Thereupon the ulceration seemed to be checked but the cachexia progressed. The child died after some days.

Autopsy revealed the ulceration to be non-adherent to the muscle planes; the neighboring organs appeared healthy. Some hepatization was found at base of both lungs. Microscopically there was a leukocytic infiltration of the liver and a purulent bronchitis.

The umbilical ulceration did not show very characteristic lesions.

The mother of the child was tuberculous. The syphilitic nature of the ulceration was not doubted. Such lesions usually appear in infants from the eighth to the twentieth day, but they have rarely been observed in the umbilicus.

The authors believe that possibly the meager histologic findings are to be accounted for by the effects of the antisyphilitic treatment.

The Latent Meningeal Reaction in Hereditary Syphilis. The cerebrospinal fluids of forty-seven children, all of them over 2 months of age, were examined by M. Lavergne,[3] with the following results:

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(2) Archiv. de méd. des enfants, July, 1919.
(3) Nourrisson, May, 1919.

In thirty children in first infancy, in whom hereditary syphilis was certain, there was lymphocytosis in eighteen, and an absence of cytologic reaction in twelve. In twelve children in first infancy in whom syphilis was probable but not demonstrated, four fluids showed lymphocytosis and eight showed no reaction.

In twenty-three in whom syphilis was certain, hypertension of the fluid was found. In eleven cases of probable syphilis there were three cases of hypertension.

In twenty-six cases of undoubted syphilis protein was clearly increased in five; in twelve cases of doubtful syphilis it was increased in two.

The children in second infancy: In ten cases in which syphilis was certain five showed hypertension, four showed lymphocytosis and two showed increased protein.

The author presents the following conclusions:

Lumbar puncture is harmless. The writer never found any complication or bad result following it.

Lumbar puncture, systematically practiced in children of first infancy with symptoms of hereditary syphilis shows in about half the cases latent lymphocytosis.

The finding of a cytologic meningeal reaction does not suffice of itself to affirm absolutely the existence of hereditary syphilis; but it is an index of high value in favor of its existence when it is found without any acute co-existing disease.

In children of more advanced age absence of all cytologic reaction of the cerebrospinal fluid is the rule; but four out of ten such children with hereditary syphilis showed lymphocytosis.

The latent meningeal reactions, so frequent in the first years of life, very often cure spontaneously. When they persist, it is because some nervous or ocular complication has been produced.

Lymphocytosis is the cytologic reaction most commonly produced.

The proportion of albumin is relatively rarely augmented in the cerebrospinal fluid of hereditary syphilitics.

Hypertension of the cerebrospinal fluid is frequent (twenty-five times out of forty-five; and in twenty-two of thirty-three cases of syphilis).

The meningeal reactions have not appeared to the author to be related to any particular type of syphilis.

When the only sign of hereditary syphilis is a positive Bordet-Wassermann reaction, the absence of a meningeal reaction is the rule.

There may be reactivation of lymphocytosis by the lumbar puncture and this seemed to occur in three of the author's cases.

Discussing the interpretation of the meningeal reactions the author concludes that the nervous system in hereditary syphilitics is undoubtedly affected to a certain measure; the encephalon and its envelopes are not in a state of perfect integrity. They are weakened.

The final conclusion which the author reaches is that in a heredosyphilitic, every change in the cerebrospinal fluid, judiciously interpreted, ought to be considered as a manifestation as significant as any other symptom, and justifies energetic treatment. In a child afflicted by heredosyphilis in whom lumbar puncture shows a distinct meningeal reaction an intensive mercurial and if possible arsenical course of treatment ought to be instituted until the lympocytosis disappears.

Immunity in Syphilis with Special Reference to Congenital or Prenatal Syphilis. J. A. Kolmer[4] states that all our present information indicates that complete sterilizing immunity, that is, complete cure of syphilis, occurs but rarely, if at all, without specific medicinal aid, and that while the untreated parent may acquire some resistance, he or she will probably always harbor virulent treponemata capable of causing recrudescences of the disease in tissues and organs of diminished resistance and eventually kill by degenerative processes. Clinical opinion is generally to the effect that while the male is infectious for only two to five years after contracting the disease, depending upon the kind and thoroughness of treatment, and that he infects his child by first infecting his mate rather than by direct primary infection of the ovum with treponemata carried over in his semen, the mother may continue to transmit the disease

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(4) Archiv. Pediatrics, March, 1920.

for a longer period of time and bear syphilitic children for years after the disappearance of her own symptoms; it is probable, however, that further investigations will show that the untreated and uncured syphilitic of either sex may continue to transmit treponemata of attenuated virulence for longer periods, the lesions and symptoms of the transmitted disease being correspondingly mild and apt to escape clinical detection, particularly by those physicians whose knowledge of the disease is limited to the text-book descriptions of the typical and relatively severe forms of syphilis seen in the new-born.

The author discusses the value and limitations of the Wassermann and the luetin reactions and then says: The interpretation of the law of the celebrated Irish surgeon Abraham Colles, announced in 1837, and independently by Baumes in 1840, is now readily understood; according to his so-called law, the apparently healthy mother of a syphilitic child may suckle her offspring without danger of contracting syphilis, whereas a wet-nurse may become infected and usually with the production of a chancre on the nipple. Since the mother appeared healthy it was naturally surmised that she had been immunized to syphilis as the result of carrying in her uterus a syphilitic child; it is now known, however, that the blood sera of a large percentage of these mothers yield positive Wassermann reactions and, according to Keyes, the majority develop tertiary syphilis in later years. These facts indicate that there is very probably a sufficient degree of true immunity produced to keep the infection of the mother in a latent or dormant condition but not the high immunity supposed to exist by Colles and universally believed until a few years ago, the resistance of the mother to re-inoculation by her child being due rather to a state of ''anergie'' or local resistance of the tissue cells as a result of the presence of living treponemata in her body.

Likewise, the so-called law of Guiseppe Profeta, promulgated in 1865, has undergone a similar revision. According to this law an apparent healthy child, born of a syphilitic mother, may be nursed by its mother or a syphilitic wet-nurse with impunity, whereas another child may be infected with syphilis by either woman. This so-called law was based upon the assumption that the child was immunized *in utero* against syphilis by its syphilitic mother, and this may be true to the limited extent of being able to keep virulent treponemata in a dormant state, but the real resistance of the child to infection is probably due to the presence in its little body of living treponemata and these children are especially deserving of close clinical and serologic study for the evidences of latent syphilis.

Therefore, the majority at least of apparent healthy mothers of syphilitic children, and the apparent healthy children of syphilitic mothers may be regarded as infected with syphilis and especially so if both have been exposed to inoculation and have escaped, which is probably the best evidence of local tissue resistance due to latent syphilis; certainly all attempts to confer immunity in syphilis by either active immunization with vaccines or treponemata or by passive immunization with the injection of blood serum from syphilitics, may be said to have failed because free antibodies in the blood are not produced in syphilis and certain other protozoan infections to anything near the same extent as in the majority of bacterial infections. In other words, there is no evidence to support the original beliefs of Colles and Profeta that antibodies against syphilis are produced by the cells of a syphilitic mother and passively transferred to her child or that these are produced by a syphilitic child and passively transferred to its mother.

As a part of the present day propaganda for the wider recognition of syphilis and its adequate treatment, the author urges upon pediatrists the closer clinical and immunologic study of all children born of syphilitic parents, even if the only evidence of syphilis in the latter is a positive blood Wassermann; likewise, the children born of a marriage in which one or both of the parents are known to have had syphilis but pronounced cured or safe on the basis of treatment, should receive special study.

These clinical studies may require the services of several specialists working in coöperation because syphilis may manifest itself in so many ways and attack practically every tissue and organ of the body. It would also appear advisable to regard every child of syphilitic parentage as infected and administer antisyphilitic treatment even though it appears healthy and gives negative Wassermann reaction. The same practice should hold for the apparently healthy mothers of syphilitic children. The adoption of these rules may mean that sometimes treatment may be given unnecessarily to both mothers and children because there is much clinical opinion to support the view that syphilitic parents may not transmit the disease, but our knowledge of the transmission of syphilis is woefully incomplete and Kolmer believes it safer practice to regard the possibility of transmission always present so long as either or both of the parents are uncured.

Symptoms of Congenital Syphilis. One hundred and twenty-seven cases of congenital syphilis were studied by R. Krost,[5] who divides congenital syphilis into the early, the late and the so-called latent form.

The first two of these groups must be again divided: Early syphilis into embryonal, fetal and infantile types; late syphilis into late manifestations of a previously active syphilis and those cases which only appear late in childhood or in adult life without having shown signs before.

Most of the subjects of fetal syphilis are born dead and may or may not show signs of syphilis externally. If they do, a maceration of the skin or a pemphigoid eruption is apt to be present. The diagnosis in these cases is best made at autopsy.

In the children born alive with signs of syphilis a pemphigoid eruption is occasionally present.

This eruption differs from the so-called pemphigus neonatorum in having a more infiltrated base with more inflammatory reaction and by not showing the same tendency to rapid spreading.

Rhinitis is present frequently and at times there may be a papular eruption but more frequently the characteristic thickening of the skin over the palms and soles is present.

In the infantile type the signs of syphilis appear in

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(5) Illinois Med. Jour., Octobe*, 1919.

the majority of the cases during the first three months and most of them show lesions during the first month. The time at which the lesions appear having in most cases a definite relation to the severity of the infection, the earlier the lesions appear the more severe the infection.

The first symptom to appear in most of the author's cases was the snuffle. Because of the frequency of head colds in infants only those cases were classified as luetic snufflers in whom the snuffles had persisted for a number of weeks and was accompanied or followed by other symptoms.

Snuffles is at first usually dry, later it becomes serous and then mucopurulent or bloody. The sides of the nose and upper lip are frequently excoriated; the formation of crusts in the nose together with the swelling at times render nasal breathing almost impossible. The author saw such a case in an infant who had had two operations for adenoids without relief and in whom the symptoms cleared up promptly under mercury. If untreated this process in the nose may go on to destruction of the cartilaginous septum and the bones of the nose and the typical deformities result—buck nose and saddle nose.

Next to snuffles the eruption was the most frequent initial symptoms.

The macolopapular eruption was rarely found alone and the pustular was not seen.

The papular form in infants is more apt to ulcerate and macereate and coalesce due to the tender skin of the infant, and also to the moisture present; this was especially noted in the diaper region.

The typical skin lesions of congenital syphilis are not, however, these lesions mentioned—there are other lesions peculiar to congenital syphilis and found much oftener. They appear as circumscribed or diffuse infiltrations of the skin found often around the mouth, forehead and cheeks, but more especially on the soles of the feet and the palms of the hand and in the gluteal region. The skin of the affected area feels slightly thickened and stiff; it is shiny as though varnished over. The color depends somewhat upon its location; on the hands and feet it is dull red or reddish brown, on the face frequently the color of a cigarette smoker's fingers. These affected areas are at first smooth, later they may desquamate after first showing irregular fissures. The skin frequently peels off especially on the palms and soles and this process may be repeated.

The blood frequently shows a secondary anemia, at times very severe, one case showing a red count as low as 1,700,000; hemoglobin, 35 per cent., and white cells 24,000, with a normal differential count. This case cleared up quite promptly on treatment.

Changes in the long bones are not very common in the infantile type. Three babies had a diffuse swelling just above the elbow, one just above the ankle, and in one the lower ends of both the humerus and tibia were involved. These swellings were painful to touch and a great deal of pain was present on motion. These swellings were of rapid development and two of them broke down and discharged before treatment could arrest them. There was, however, no permanent deformity.

In the flat bones spots of softening were relatively common (cranio-tabes). Some of the babies showed excessive formation of bone in the parietal and frontal regions; two cases showed the bony hypertrophy along the sutures.

In the viscera the most frequent change was found in the spleen, which was enlarged in about 80 per cent. of the infantile cases. The enlargement was usually not marked but at times was very much so. Under the age of 4 months an enlarged spleen usually means syphilis or tuberculosis.

Enlargement of the liver was frequent, but means little because so many things cause enlargement in babies. The lungs showed nothing that could be ascribed to syphilis. Three cases had congenital heart lesions, a proportion a little too high to be a single coincidence. Two cases showed an enlargement, and hardening of one testicle.

Changes in the nervous system are not rare, even during infancy, though not as frequent as later in life. Thus in twelve cases, a noticeable bulging of the anterior fontanelle was present, due to varying degrees of hydrocephalus. One of these infants had a marked opisthotonos and generalized rigidity, with increase in the spinal-fluid pressure; convulsions were also present. The whole picture cleared up on large doses of mercury.

Brain hemorrhage occurred in one baby at 9 months of age and the child, now 9 years old, is a typical hemiplegic.

A history of repeated convulsions was obtained in four cases but two of these babies also had marked rickets, so that convulsions have not seemed an important symptom.

The special senses are affected as often during infancy as later. In a few cases the author has seen chronic otitis media with a history of sudden onset during the early weeks of life. The eyes during infancy in the author's cases have shown nothing.

Generally these babies are backward physically, although mentally most of them seem quite normal during infancy. An infant with congenital syphilis is usually hard to feed even on the breast and still harder on the bottle. In thirty-eight infants under 1 year of age, in whom the weight had been recorded, only four were up to normal weight for their age, the remainder were from one to eight pounds under weight.

Even under energetic specific treatment and the most careful feeding the gain was slow or there was even a loss. The resistance of these babies is very poor; they are always ill and and the mortality from the ordinary diseases of infancy is high.

In considering the manifestations of late syphilis, comparative rarity of skin lesions is to be noted. Two main forms occur—the small and large nodular syphilide, though in the first few years after infancy the author still found the ordinary lesions. The large nodular syphilide is probably a skin gumma; it breaks down at times and leaves a ragged ulcer with indurated edge which is very hard to heal.

The mucous membranes in late congenital syphilis are frequently affected, condylomata are more frequent than during infancy; one baby had condylomata-like masses all over the anterior part of the tongue. The mucous membrane of the throat, larynx and nose are often affected. Gummatous processes in these regions break down and form large ulcers on the soft palate or tonsils.

Athrepsia in Hereditary Syphilis. Hereditary syphilis, say L. Ribadeau-Dumas and G. Faroy,[5] causes profound alterations in the liver, pancreas and parotid glands. These alterations are manifested by digestive disturbances in the affected child. The first symptoms and signs are almost exclusively observed in the intestinal glands, their origin being in the small vessels and capillaries which surround the glandular acini. The lesion always develops there. In the infant the visceral lesions due to hereditary syphilis are different from those of the adult. Thus if the fetus survives and comes to term the liver shows the details of embryonic structure. In the pancreas the Langerhans formations develop while the acini with external secretion atrophy. Such lesions may exist in various degrees. They may not be incompatible with extra-uterine existence.

The pathogenic agent of syphilis has a marked affinity for glandular epithelium such as the suprarenal capsules and the digestive glands.

The diffusion of hereditary spirochetal infection and its elective action for glandular epithelium explains the extreme fragility of infected infants. Lesne says that the specific treatment ought to be prompt and energetic because the disease is strong and the infant weak.

But the treatment requires regulation. The state of the digestive glands necessitates good alimentary hygiene, especially mother's milk. With artificial feeding the functioning of the glands should be supervised. Infants bear specific treatment very well, both mercury and arsenobenzol. The best method in the case of heredosyphilitics is to institute the treatment slowly commencing with weak doses trying to raise the resistance to specific treatment, in order to avoid an intolerance. In this way a great number of athrepsies can be saved who in reality are only heredosyphilitics who have suffered profound histologic alterations of the glandular tissues.

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(5) Nourrisson, May, 1919.

Observations on Congenital Syphilis in Australia. An account is given by E. M. Kent Hughes[6] of cases of congenital syphilis diagnosed at a children's hospital during nine months.

The ages of the patients varied from 3 weeks to 8 or 9 years. The most strikingly successful cases have been those of breast-fed babies with skin lesions. Most of the syphilitic infants looked healthy when born and if they were breast-fed and treated immediately after the lesions appeared they did well. Artificially-fed infants were very difficult to treat and most of them died of gastro-enteritis.

The skin lesions varied considerably. One baby 3 weeks old was covered from head to foot with scaly circinate sores resembling rupiae; they cleared up completely after two injections. Others had scattered papules and macules on the body and intense erythema of the buttocks. The commonest lesions were peeling macules of fingers and toes and buttock rash. Many children had snuffles.

The older children, as a rule, were well developed and had none of the classical stigmata, such as saddle-back nose, Hutchinson's teeth, frontal bossing, etc. They had been suffering generally from one special manifestation of the disease and because they looked healthy, their condition was undiagnosed. Several apparently perfectly healthy children whose serum yielded a positive Wassermann reaction, were treated, as their brothers and sisters had various lesions. The author had four cases of troublesome glossitis, all associated with positive Wassermann reaction; three appeared otherwise healthy, the fourth was sent in with myocarditis and had been three months in bed. There were two cases of delayed dentition and one of caseation and infiltration of the cervical glands and necrosis of the nasal bones. Another child was admitted partially paralyzed with meningitis. Two children with strabismus gave a positive Wassermann reaction. In one the disease was congenital and in the other the symptoms had only been noticed for four months.

A positive Wassermann reaction was obtained in all

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(6) Med. Jour. Australia, Oct. 18, 1919.

the older children, but some of the obviously syphilitic infants gave a negative response to the test. In two of these cases the author tested the mother's blood and found a positive reaction. On the other hand, the serum of the mothers of several syphilitic infants gave negative results.

The author used arsenical preparations combined with mercury and iodine in the treatment of his cases.

The initial dose of novarsenobenzol or neo-kharsivan was as follows:

Under 1 year	0.05 gm.
1 to 3 years	0.1 gm.
3 to 5 years	0.15 gm.
5 to 7 years	0.2 gm.
7 to 9 years	0.25 gm.
Over 9 years	0.3 gm.

Six weekly injections were given. For infants under 1 year of age the dose was increased by 0.01 gm. each injection. For children under 6 years the dose was increased by 0.02 gm. and over 6 years by 0.03 gm. each injection.

Mercury in the form of hydrargyrum cum creta orally, or collosal hydrargyrum by injection was ministered together with the arsenical preparation. The tablets were taken daily (0.015 to 0.06 grm.) three times a day according to the age. The injections are given weekly; 0.6 c.cm. is the dose for children of 6. Other patients were treated by inunction, 0.6 to 1.2 grm. being rubbed in daily. There has been no time to say which method has been the most effective; all in-patients were treated by inunction and also those out-patients whose parents were reliable.

After the six weekly injections of novarsenobenzol, mercury was continued for three months and then a Wassermann test was performed. If negative mercury was continued for a month, potassium iodide given the next month and then the patient had a month's rest. If the Wassermann test was again negative the treatment was repeated; if positive another course of novarsenobenzol was given, the initial dose of the second course being the same as the fourth dose of the previous series.

The Relative Efficiency of the Different Mercurial Preparations. From a series of experiments, W. R. Ramsey and O. A. Groebner[7] conclude that in the treatment of syphilis in children mercurial ointment, 50 per cent., is to be preferred to the less concentrated forms and need not be repeated more than twice weekly instead of daily. The quantity of mercury absorbed is much increased by friction.

Calomel ointment is absorbed but less rapidly and to a less extent than the mercurial ointment and should, therefore, be given in greater concentration.

The salicylate of mercury in oil should be given hypodermically twice weekly instead of once.

The mercuric chloride, by hypodermic injections, although the dose is very small, continues to be eliminated for six or seven days. The fact, however, that its use frequently is followed by the appearance of protein in the urine should exclude it from the treatment of syphilis in children.

Calomel by the mouth is absorbed in small amounts, and continues to be eliminated for a considerable time so that it is probable that it would be sufficient to give it at intervals of several days, thus avoiding diarrhea.

Gray powder is absorbed to a small degree and eliminated rather rapidly so that large doses repeated daily would probably be necessary to maintain mercury in the circulation.

MISCELLANEOUS.

Heliotherapy: Its General Use in Pediatrics. W. P. Lucas[8] reviews the history of heliotherapy and the physics of the sun rays. He then discusses the physiologic and clinical action of these rays.

The sun's physiologic action has been studied less than its physical action. It is rather more difficult to measure accurately the effects of light and sun from a physiologic point of view than it is from the point of view of physics. Still certain rather significant ob-

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(7) Amer. Jour. Dis. Child., September, 1920.
(8) Archiv. Pediatrics, April, 1920.

servations have been made during the past few years. Rollier mentions the increase in hemoglobin and red blood cells, also the increase in eosinophiles. D'Oelsnitz has carried on some interesting observations at Nice, in which he attempts to demonstrate changes, immediate and late, in the temperature, respiration and blood. Temperature and respirations are usually increased at the first of the treatment. Very soon the respiration strikes an equilibrium unless there is intolerance to the treatment when it continues to be irregular. Temperature is always elevated, as is the pulse, but this acceleration strikes a constant equilibrium which has more or less of an individual variation and an hour after treatment it is back to its normal. Irregularity in temperature and pulse, which continues after the treatment, is a direct indication of intolerance and if more than a degree of fluctuation in temperature occurs, especially, if this is irregular, it should be taken as an indication that the treatment is not being well tolerated. As to the change in the blood, the number of red blood cells is increased and the hemoglobin is also increased. The variation in both red cells and hemoglobin may not be noticed immediately; however the leukocytes respond more quickly. This response, of course, varies considerably according to whether the tuberculous process is open or closed.

The mononuclear changes are perhaps more significant. Arneth's formula is of some value from a prognostic standpoint. There is a definite increase in the eosinophiles. This is equally true of marine baths, as well as sun baths, which would be a point in favor of having treatment carried on at the sea level instead of at a high altitude. The tuberculin reaction is increased in active cases and this is an indication of proper progress of the disease. D'Oelsnitz considers that keeping close observation over the variations in temperature, circulation, respiration and blood gives a definite criterion by which to judge the success or failure of the treatment.

In pulmonary tuberculosis, as well as in intestinal tuberculosis, hemorrhage is always a contraindication to continuance of the treatment. Progressive loss of weight is also a further contraindication, though at first loss of weight may occur in cases that progress otherwise favorably; however, loss of weight should not be allowed to continue very long, and indicates a diminution in the amount of treatment. Pigmentation is always a sign of tolerance.

Many authors mention that anemia is benefited by an increase in the hemoglobin and red cells. They do not state what their conclusions are based on. The discussion of whether the treatment is better carried out at sea level or high altitudes, varies almost entirely as to whether the writer is located on the sea or at an altitude. The unanimity of opinion seems to be that moderate altitude is best except in children in whom marine treatment is of considerable value especially in open tuberculosis of the bones. The general feeling is that pulmonary tuberculosis is not much benefited by treatment with the direct rays of the sun. Conditions in which it has been used are tuberculosis of the bony system, open tuberculosis with fistulas and secondary infections. Practically all the literature, especially from the time that Bernhardt and Rollier started to develop the sanitoria, have been along the lines of chronic tuberculosis of the bones. There seems to be little doubt but that this form of tuberculosis receives distinct benefit from it.

Rollier mentions the value of sun treatment in peritonitis, and, in combination with surgery, especially in peritonitis cases with extreme ascites. D'Oelsnitz also considers that tuberculous peritonitis can be very successfully treated even if there is considerable temperature. Simon thinks that in chronic cases, in which the peritonitis has passed the active inflammatory stage, it is markedly beneficial. Catalena mentions its use. Osborne, in New Zealand, reports an interesting case of tuberculous peritonitis healed by its powers.

In cervical adenitis, there is little doubt that it is of considerable value, not only in the stage before abscess has set in but even in patients who have been treated for a long time and apparently have contracted a secondary infection. In these cases it is especially indicated. Rollier believes that it is of definite benefit in glandular cases, both cervical and tracheobronchial, as do

Joubert and Rivier. The sea shore is probably better for glandular tuberculosis and tuberculosis with secondary infection than the high altitude. Rollier, Leriche, Joubert, Rivier and others believe that it is applicable to the treatment of renal tuberculosis and cystitis, especially noting that the pain and discomfort in cystitis and pyuria are markedly diminished, even when cure is not effected.

Authorities differ considerably as to the efficacy of this treatment in pulmonary tuberculosis. Apparently it depends on what stage the pulmonary tuberculosis has reached and the individual reaction of the patient.

There are the two important considerations. There is little doubt that in active progressive cases of pulmonary tuberculosis, in which there have been frequent hemorrhages, where the parenchyma is rapidly being involved, and where there is a septic type of temperature, sun baths are contraindicated, whereas the chronic or fibrous types of pulmonary tuberculosis, which are not progressing in a septic manner, may be greatly benefited by the tonic action of the direct sun rays. There should be very close medical supervision in such cases. Simon considers that in the torpid bronchial form, even when there are cavities that are stationary, the results may be beneficial, but in the febrile type it increases the fever and there is also the chance of hemorrhage, and in these cases the nervous symptoms are also increased and the weight and appetite are adversely affected. On the other hand, Pottenger believes that it is an individual matter that some cases of pulmonary tuberculosis are benefited and that the difference between stimulation and irritation in these cases is only one of degree. He thinks that if patients are watched carefully it can be noted who are losing weight and appetite and in whom nervous irritation is being increased. In such cases it is contraindicated; whereas in anemic cases the hemoglobin and number of corpuscles are increased in the circulation, tissue tone is improved and the condition of the skin benefited. Pottenger believes very strongly that sunlight has no specific action and can not be considered as a cure, but as an aid to be classed with open air, good food, hygiene, proper adjustment of rest and hydrotherapy.

A. Treves and J. Andrien both say that heliotherapy is not a form of treatment. Malgat does not think it applicable to pulmonary tuberculosis and tuberculosis of the pleura, as he says it provokes congestive processes and may bring on hemoptysis. Even in latent cases, he thinks it brings out the processes and makes them active. He also advises caution in its application in the tracheobronchial adenopathies.

Its use in this country in tuberculous conditions has been carried on very extensively by Campbell. He reports many cases of tuberculosis of bones in which there has been very marked improvement. These have also been reported by Hammond, of Providence, and Yelt. Pottenger has used it as an accessory in the treatment of pulmonary conditions and so also has Kime.

A number of men have reviewed the work as seen at Rollier's clinic, especially Dietrich, Yelt and Austin. The use of heliotherapy in non-tuberculous conditions has received considerable attention. Aimes, in a very good article, speaks of its effect. He believes that it should be used more with convalescents as it shortens their period, especially where there is a tendency to anemia, but in connection with cachetic and wasting conditions, it may be a contraindication as they can not stand the stimulation. However, under the treatment from a convalescent standpoint, hemoglobin is increased and weight is put on very rapidly. He found it of considerable benefit in scoliosis, rachitis, acute articular rheumatism and in tracheobronchial adenopathies. He quotes from Emmett of Philadelphia and Snegurieff of Moscow, who also claimed that it was very valuable. Kellogg, at Battle Creek, makes the same claim. The debilitated functions are exhilarated, nutrition is markedly improved, activity of secretions is marked and the internal organs are better oxygenated. Kellogg, with Singer of Berlin, says that neurasthenic patients are benefited by sun baths, especially in combination with other mechanical and therapeutic measures.

Symptoms of Withdrawal of Morphine in an Infant. L. A. Van Kleeck,[9] reports the results of the withdrawal

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(9) Amer. Medicine, January, 1920.

of morphine in a new-born child whose mother had been taking camphorated tincture of opium for dysmenorrhea since her menstruation began at the age of 13 years. At first she took from 10 to 15 minims for the relief of pain. This was increased to 1 or 2 drams each day of the menstrual period. Later she took codeine and morphine. Finally she became a drug addict. She was married four years and her first pregnancy occurred at the age of 32. She was taking from 4 to 5 grains of morphine sulphate daily in the third month of her pregnancy. The labor was normal, as was the postpartum period, and milk was established on the fourth day.

The infant was apparently normal and weighed 7½ pounds. It cried lustily at birth. On the second day the child's condition became alarming without apparent cause. The pulse became weak and imperceptible; the skin was pale and bathed in cold perspiration; the mucous membranes and extremities were cyanotic; respirations were rapid and shallow; vomiting and diarrhea were marked, and the child presented a clinical picture of distinct clinical shock. The routine measures for shock were tried without response. In view of the fact that the mother was addicted to the use of morphine the child was given 3 minims of paregoric and the dose repeated in one-half hour for three times. The effect was almost like magic. The pulse improved, the skin became warm, the cyanosis disappeared, the vomiting and diarrhea stopped. In fact in three or four hours the condition was very nearly normal. The condition recurred on the third and fourth day and the same treatment was instituted with prompt relief of the symptoms. When the milk appeared and the child began to nurse the condition did not reappear. At the end of six months the child was still nursing and both parent and child were doing well.

Van Kleeck states the explanation of the symptoms in this manner. When a drug habit is acquired there are formed antitoxic substances which in themselves are toxic when not neutralized by the drug itself. The child inherited from the mother the antitoxic substance against morphine and when it was cut off from its supply of morphine the antitoxic substance was unneutralized and produced the symptoms which only morphine could relieve.

Methods of Administering Saline and Other Solutions to Infants and Children. The value of administration of fluid to infants and children in emphasized by J. Aikman,[1] and the various routes of introduction into the system are discussed, the following being an outline of the methods:

Administration of fluid by mouth; rectal administration; hypodermoclysis; intravenous injection; intrasinus injection; injection in the femoral vein, and intraperitoneal injection.

Active Immunization of Infants with Special Reference to Vaccine Therapy in Furunculosis. It was found by C. Frankenstein[2] that new-born and young infants are unable to build specific antibodies. It is best, therefore, to speak of vaccine therapy in the sense of foreign-protein therapy instead of active immunization.

The author treated furunculosis in infants by daily injections of large doses of vaccine which, he says, gave very favorable results. He believes that this method of treatment gives better and more lasting results in a shorter period of time.

A Study of Achondroplasia. T. F. Wheeldon[3] says that achondroplasia is characterized by symptoms of dwarf growth (shortness of extremities, vertebral column and chest and looseness of the skin) and symptoms of infolding (kyphosis baseos cranii, sagittal narrowing of the foramen magnum, depression of the nasal bridge, narrowing of the choanae, reduction in the size of the sella turcica with consequent reduction in the size of the pituitary body, and changes in the spine).

The changes of achondroplasia are probably due to the smallness of the amnion, except in rare cases.

The changes of achrondroplasia are produced between the third and eighth weeks of intra-uterine life.

The pathologic changes consist mainly in a retardation of ossification of the epiphysis and the diminished

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(1) Jour. Amer. Med. Ass'n., Jan. 24, 1920.
(2) Zeitschr. f. Kinderhk., vol. 25, May, 1920.
(3) Amer. Jour. Dis. Child., January, 1920.

production of endochondral bone, while the periosteum produces a comparatively normal amount of bone.

Besides the deformities of the bones, the characteristic roentgenologic appearance of a long bone under examination shows that near the epiphyseal ends the diaphyses become cupshaped, producing a T-shaped outline without any disturbance of the epiphyseal line or zone of proliferation, though these may be uneven and take on more or less fantastic shapes as compared with those of a normal individual.

All the cases presented by the author bear out these statements, and, in addition, two of them show a new symptom, a wedge-shaped vertebra, which falls in the group of symptoms of infolding, and fortifies the belief that the state of achondroplasia is produced by the smallness of the amnion.

Cranial Sinus Thrombosis in Children. That the symptomatology of sinus thrombosis in children is in a measure that of the condition in adults, is the opinion of S. Oppenheimer.[4]

There are two recognized forms of thrombosis—primary or marasmic; and secondary, or infective, sometimes termed inflammatory. Marasmic thrombosis occurs much less frequently than the infective, and is almost invariably located in the longitudinal, rarely in the lateral, and still more rarely in the cavernous sinus. It occurs in weakly people, prostrated by exhausting diseases. It is met with in the young most frequently during the first two years of life and more especially during the first six months of infancy. Exhausting diarrhea is one of its most potent causes in children, although acute and chronic pulmonary affections also play an important etiologic part. Gowers believes that primary sinus thrombosis is of frequent occurrence, and that it is a not uncommon cause of infantile hemiplegia. It may occur in connection with chlorosis and anemia, the so-called autochthonous sinus thrombosis. Of eighty-two cases of sinus thrombosis in chlorosis, thirty-two were in the cerebral sinuses. The longitudinal sinus seems to be most frequently involved in these latter

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(4) Archiv. Pediatrics, February, 1920.

cases usually associated with venous thrombosis in other parts of the body.

The diagnosis of primary sinus thrombosis in children is difficult and is seldom made during life. There are none of the characteristic symptoms of temperature which are found in infective thrombosis; oftentimes the symptoms are prone to be masked by the disease which precedes it and which is the cause of thrombosis. In a larger number of cases the disease is latent in children, the symptoms few and uncertain and very rarely is a positive diagnosis made.

Children affected with marasmic thrombosis are prone to convulsions. These convulsions are usually general and are accompanied by unconsciousness. Bouchet observes that convulsions occurring at the beginning of an acute malady are not of serious import, usually heralding one of the exanthemata or a phlegmon; but when they occur at the end of an acute and exhausting or during a chronic illness which has greatly reduced the patient, then marasmic thrombosis is to be feared. Occasionally the convulsions are unilateral, and may even be confined to one member. Gerhardt and Petrens have observed an inequality in the feel of the jugulars of the two sides among marasmic children. Epistaxis is an occasional symptom. Strabismus, tremors of the lower extremities, contractures and muscular rigidity are frequent and are probably due to a meningitis. Thrombosis of the retinal vessels is occasionally observed. The prognosis is bad in marasmic thrombosis and a majority of the patients die in a few days.

In view of the impossibility of a definite diagnosis in most cases, the treatment must be wholly symptomatic. Roborants and stimulants are indicated; a position in bed should be assumed that is favorable both to the arterial and venous circulations, care being taken that the clothing does not restrict the neck. The internal administration of potassium iodide and calomel has been recommended in the autochthonous forms, but no treatment is likely to prove of avail.

Secondary or infective sinus thrombosis is much more frequent than the primary or marasmic form and follows extension of inflammation from parts contiguous to the sinus wall. It is the term usually applied to thrombosis which arises from invasion of the sinuses by pathogenic microörganisms.

It occurs almost as frequently in children as in adults. It generally affects one of the dual sinuses, while marasmic thrombosis affects the single median or azygos sinuses. It is local in origin, secondary to some inflammatory lesion of infective character and occurs in the sinus nearest the seat of the primary disease. Infective thrombosis is often associated in its later stages with meningitis, and not infrequently with small cerebral or cerebellar abscess.

The three chief causes of sinus thrombosis are sepsis, damage to the vessel walls, and stasis. In children infective sinus thrombosis may follow skull fractures, scalp wounds, anthrax of the lip, mouth, nasal and orbital cavities, erysipelas of the face and forehead; furunculosis of the lips, face or neck.

The author states that suppurative middle-ear lesions are by far the most frequent causes of sinus thrombosis. Males seem to be more frequently affected than females. The disease may also occur as a complication of a diphtheritic infection of the middle ear or of scarlet fever, but more often from measles and influenza.

The most important general symptom of lateral sinus thrombosis is fever which rises excessively high in young children. Particularly when the presence of a high temperature is persistent in conjunction with acute mastoiditis and a pyelitis is operation justified even though a blood examination fails to show bacteremia. An important point in a case under suspicion is the taking of two-hour temperatures in order to note accurately the varying oscillations. Typical cases occasionally present themselves in which the temperature remains steadily high without remission. In older children, there may be headache, pains in the occipital region, and tenderness upon palpation along the jugular vein, due to lymph node enlargement. A diagnostic sign of importance is a unilateral enlargement of the lymph nodes at the junction of the facial vein with the internal jugular.

Nasal hemorrhage is frequent. Drowsiness is a general accompaniment of an acute infectious process but the state of well-being so frequently seen is often deceptive and is apt to throw one off guard.

Metastasis is not uncommon. Facial cyanosis and dilatation of the temporal and facial veins, with epistaxis, suggests an involvement of the superior longitudinal sinus.

Dilatation of the cervical veins and the possible hardening of the internal jugular vein, with or without edema behind the mastoid process, suggest invasion of the lateral sinus. A sign of much diagnostic significance is the presence of a post-mastoidal edema, indicating a blocking of the mastoid emissary vein.

A symptom occasionally present is dysphagia. Upon examination of the throat, there is found a unilateral enlargement of the lymphoid tissue along the posterior fold of the pharynx. In the latter stages of the disease, edema about the orbit and a protrusion of the eye on the affected side indicate an involvement of the cavernous sinus.

These local signs alone, however, can not be relied upon as a means of diagnosis, but their close association with a more definite general symptomatology places upon them their dependable value.

In establishing the diagnosis of sinus thrombosis it is of course essential that all other diseases that might cause a like symptomatology should be definitely excluded. Among such may be mentioned pneumonia, typhoid fever, acute endocarditis, malaria and certain cases of scarlatinal infection.

In 150 cases examined, the author never observed an infection due to any organism other than the streptococcus or the *Streptococcus mucosus*. This shows the importance of a culture from the pus contained in the mastoid process at the time of operation.

The prognosis of sinus thrombosis in children depends upon the duration and extent of the disease and upon the stage at which its progress is checked by surgical interference. The earlier the operation the lower the mortality.

The treatment of sinus thrombosis of otitic origin is entirely surgical. The operative procedures are attended by the cure of a great many cases which would otherwise terminate fatally; hence the importance of early diagnosis, in which the pediatrician can coöperate to excellent advantage with the otolaryngologist.

Carotinemia: A New Clinical Picture. It is stated by A. F. Hess, and V. C. Myers,[5] that a diet rich in carotin (carrots, spinach, egg yolks, oranges, etc.,) will bring about a yellow discoloration of the skin, a condition resembling mild jaundice, except for the non-involvement of the sclera. This pigmentation, the authors believe, has been frequently overlooked, confused with mild grade of icterus, or attributed to some obscure metabolic disturbance. It can not be of rare occurrence, as carotin is widely distributed throughout our diet, being a constituent of almost all vegetable foods. It is a disturbance which, therefore, will occur most readily in those subsisting on a dietary containing a large quantity of vegetables. The discoloration of the skin is accompanied by a similar yellow tingeing of the blood serum and the plasma. The pigment in the blood was identified as carotin.

In cases of carotinemia the urine was colored yellow. When a small quantity of concentrated carotin was ingested, the pigment appeared rapidly in the urine. These observations are of interest, in view of the fact that clinicians as well as physiologists consider that the urinary pigments are formed solely from bile or its derivatives.

Congenital Hemihypertrophia Totalis. H. R. Coston[6] reports a case of hemihypertrophy totalis in a male child of 22 months. He was the fourth child of healthy parents of rather low mentality. The other three children have been mentally superior to their parents. The patient had never been ill and seemed normal mentally. The birth followed a quick and easy labor. The mother was well during pregnancy. There was available a history through six generations with only one cousin in any way defective. This child, a second cousin on the mother's side, had six toes on the right foot. There was no idiocy, insanity, epilepsy or deformity other

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(5) Jour. Amer. Med. Ass'n., Dec. 6, 1919.
(6) Med. Record, Feb. 7. 1920.

than the one mentioned in the family. Immediately after birth it was observed that the right side was "that of a ten pound baby while the left side was that of a seven pound baby." The measurements were as follows:

	Right, in.	Left, in.
Side of head	10.5	9.75
Top of head to upper border of ear	6	5.5
Chin to occiput	11.25	10.25
Chest	10.5	9
Middle of thigh	9.5	8
Calf	7.25	6.75
Foot	6	5
Anterior superior spine of ilium to external maleolus	15	13
Acromion to tip of fingers	13.5	12
Around hand	4.75	4.25

Coston remarks that cases of hypertrophy are usually on the right side and there are many cases of partial hypertrophy confined to a single limb or one side of the face. Occasionally cross cases are seen. The differential diagnosis include acromegaly, myxedema, hemiatrophy, sporadic cretinism and various paralyses. He states that there is no other treatment than applying an extension shoe to the short leg. A complete bibliography accompanies the report.

Dental Sepsis in Children. After discussing the ill effects of infected teeth in children F. St. J. Steadman[7] advises extracting all deciduous teeth in which the decay is sufficiently advanced to infect the pulp, and generally their antagonists also. He only fills the teeth when he is certain that the pulp is not affected. This condemns at once the majority of decayed deciduous teeth, because the pulps of these are relatively larger than the prominent teeth, so that a comparatively small cavity is sufficient to infect the pulp. By infected pulp he does not mean an exposed pulp. Many pulps are infected long before the actual exposure has occurred.

He treats the permanent molar teeth in the same way as the deciduous teeth if the roots are incomplete at the time of the pulp infection. The treatment recommended by many practitioners, of sterilizing and capping the

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(7) The Lancet, Feb. 7, 1920.

pulp is, in the opinion of the author, dangerous, as in the majority of cases so treated, the pulp eventually suppurates and dies under the filling, and the teeth remain tender and uncomfortable, so that the child's confidence in them is not restored and he does not use them for the purpose of mastication. Frequently they ache and the child remains with his disturbed nights.

The argument against extensive extraction in children, that mastication is lost, according to the author, is futile.

Experience, Steadman says, shows that the child regains its normal weight and health after extraction of all septic molars.

Another argument against the extraction of teeth is that it prevents the proper growth and development of the jaws. If the extraction of teeth adversely influences the growth of the jaws it is clear that if several teeth are removed on one side and not on the other, the jaws on the one side from which these teeth have been extracted will show a deficient growth; whereas, the side from which the teeth had not been removed will grow normally, giving the whole face a lop-sided appearance. Experience shows, however, that save in exceptional cases nothing of the kind happens; on the contrary, the jaws still reach their normal development on both sides, in spite of the loss of the teeth on the one side. Or again, if we extract teeth from the upper jaw and not from the lower, it has been said that the upper jaw will not grow properly but the lower will, so that we shall have brought about an ''inferior protrusion'' or *vice versa;* but nothing of the kind happens, showing that the normal growth of the upper jaw has apparently not been affected by the extraction of the teeth.

A more important argument which requires attention, he says, is that the early extraction of deciduous teeth will lead to the forward movement of the six-year-old molars, thus causing crowding and irregularities of the arch later. If the teeth are extracted before the permanent molars have occluded, there is no doubt that this will take place, but, provided the patient comes frequently for dental inspection, at the right moment one of the permanent teeth in each corner of the mouth may be sacrificed. These teeth may be either the four six-year-old molars or the four premolars, according to circumstances. If the extractions take place after the permanent molars have occluded, there will be very little forward movement.

Orthopedic Surgery

BY

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ORTHOPEDIC SURGERY.

GENERAL CONSIDERATIONS.

A Year's Observation in Orthopedic Surgery. Edward Adams[1] discusses the observations which he made while with the Base Hospital at Fort Riley, Kansas, where he had access to the records of 4,000 bone and joint cases. These comprised gunshot wounds, fractures, foreign bodies such as bullets and shell-fragments, osteomyelitis, arthritis due to infected teeth and tonsils, as well as gonorrheal and other arthritides.

The correct position for fixation of the shoulder-joint is as follows: Abduct the arm to 50 degrees, place the elbow slightly in front of the coronal plane of the body, supinate the forearm and place at right angles to the arm with the palm of the hand toward the face. This position places the scapula in the normal position and allows the hand to be brought easily to the mouth. It permits of greatest freedom of movements and retains such functions as reaching pockets, brushing hair, carrying a dinner-plate, etc. Flail joints should be ankylosed in a similar position, and joints which are in bad position should be broken down and placed as above.

Elbow joints: The patient's occupation would slightly modify one's choice of position. Where one elbow is ankylosed, 70 degrees is the angle of choice; when both elbows are ankylosed, fix one at 110 and the other at 70 degrees.

Forearm: When both pronation and supination are lost, fix the hand midway between pronation and supination.

Wrist-joint: Place the hand in the dorsi-flexed position. This should always be done if there is the slightest possibility of ankylosis occurring in an injured wrist.

Hip joint: Fix the thigh in slight abduction of 10 to 15 degrees, full extension and slight outward rotation.

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(1) New York Med. Jour., May 29, 1920.

This is recognized as being the best position for the average and usual occupations.

[Many experienced surgeons now believe that slight flexion of the hip joint is more desirable than complete extension.—Ed.]

Knee: Flexion of fifteen degrees.

Foot: Right angle to leg with slight varus rather than valgus.

Flail joints: Operate and fix all flail joints except the hip. The hip can be made useful by a simple mechanism allowing slight motion.

Nature of wounds: The size of the entrance and exit wounds together with the kind of missile will determine the urgency of the case. The irregular torn shell wounds are much more dangerous than the small bullet wounds. All healed wounds should be allowed six months interval before secondary operations are attempted, to prevent, if possible, the lighting-up of the old infection. The bacillus of gas gangrene, the streptococcus and the staphylococcus are the most frequent organisms found, the streptococcus being the most dangerous.

Radiography: Plates should be taken in two planes, and stereoptic views are of advantage when joints are involved.

Joints: Rest and fixation with extension are the essential principles in the early cases of septic joints. The Thomas splint, or some modification can be used, leaving the wound wide open. Sterile gauze packing is used, moistened with Dakin's solution, and changed as infrequently as possible to prevent contamination.

Osteomyelitis: Five hundred units of antitetanus serum are given; operative field is sterilized with 5 per cent. dichloramine; tract is injected with 0.5 per cent. permanganate of potassium, the scar and all devitalized tissue being removed. All overhanging edges of bone are chiseled away, hemorrhage is arrested, wound packed with sterile gauze wet with Dakin's solution, and splint applied if necessary. The skin is protected from Dakin's solution with 10 per cent. boric vaseline gauze. On the third day, Carrel tubes are inserted and the instillation method used. At the end of one week microscopic control is started, and when for three successive days the control shows one or less than one microbe to the field, the wound is closed by suture. Healing by primary union will follow. The author used an electric hot-air hair-dryer with marked benefit in 500 cases.

Swimming as an Aid in Orthopedics.[2] At the special orthopedic hospital at Tooting, the officer in charge, with the help of the British Red Cross, established swimming baths. These baths had a beneficial effect upon many of the patients who used them.

The effect upon cases, for instance, of partial paraplegia is produced by a combination of causes, physical, physiologic and mental.

When a man swims, or while he is learning, the muscles receive natural physiologic stimulus originating in the cortex, and a beneficial mental effect is produced by the man's discovery that he can move his limbs and get about in the water.

Should Mankind Be Ambidextrous? In the discussion of this subject, F. Regnault[3] observes that if we study the isolated and successive movements of each hand, we shall find that the left one prefers acts calling for durable muscular contractions, it carries objects, baskets, children. During walking the right hand is free, ready to execute rapid movements, calling for force or skill, *e. g.*, removing an obstacle, use of handkerchief, etc. The left hand is static, the right one dynamic.

Specialization begins as soon as the child starts to execute delicate movements with its hands. The right half of its body is congenitally stronger, and the left hemisphere of the brain heavier than the opposite side. Hence, the child instinctively prefers the right hand for voluntary movements of force and skill; if it is left-handed, the reverse will be true. We know how difficult it is to change the left-handed habit, and when it is not entirely corrected, the child always tends to use its left hand. It does not follow that a right-handed or left-handed individual can not with the less expert hand carry out delicate movements. But to attain this end a long and painful education is necessary. It is done

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(2) Brit. Med. Jour., May 17, 1919.
(3) Presse méd., April 21, 1920.

where it proves to be advantageous in the calling pursued.

The stump of the right hand can be replaced by use of the left hand, and even for such delicate maneuvers as writing, painting, even at advanced age. However, the utility of ambidexterity in the trades is exceptional, and the examples of stumps proves it is not necessary from childhood on.

Coming now to the simultaneous movements of both hands: We naturally contract the same muscles and execute symmetric movements. This can be seen not only in reflex and automatic ones, but in voluntary movements as well. Very few trades call for symmetrical movements, and when needed they are always of a simple nature, *e. g.*, a man using a hammer, spade, weeding, swimming.

By education we can rapidly acquire complicated symmetrical movements, such as those which permit mirror-writing with the left hand. It has been proposed to develop this aptitude in the child, but this would be disadvantageous, because if the child should be unfortunate enough to lose the right hand, it will have to overcome the habit of mirror-writing so as to use the left hand for writing in the usual manner.

Moreover, nearly all trades demand simultaneous dissymmetric movements, and here as already observed, the dynamic motions of force and skill devolve on the right hand, the static movements on its mate. The latter holds the cloth while the right one pushes the needle through, the paper for folding, the meat to be cut, etc. Therefore, the left hand tends instinctively to carry on movements symmetrical to those of the right. But the daily occupations thwart this instinct, hence they demand some effort, some apprenticeship on part of the child.

As is well known, many children, to say nothing of adults, make little use of the left hand, resorting to the right almost exclusively—writing without holding the paper with left hand, and so forth. Here children should be watched, and taught to make use of both hands. The output of a workman can be increased if he uses both hands simultaneously.

Certain professions require of both hands different—

though simultaneous—movements which are dynamic, yet delicate. As mankind becomes more civilized, these professions grow more numerous. Take music for example; among savages this is confined to simple motions of the right hand which strikes the tom-tom, or to simultaneous and symmetric movements of both hands, which shake castanets; their flute has but a single opening, their violin, but one string. At present we know how complex are the movements necessary for the piano, the violin, etc. For such instruments the movements of the left hand are as difficult as those for the opposite one.

The same evolution may be followed in many other trades, to become perfect in them needs more and more skill, only to be acquired by long practice difficult to imagine by one who has not actually undertaken it.

To reduce this apprenticeship it is well to begin at an early age the exercise of both hands playing ball and the skipping-rope, are useful. It is well also to start up exercises such as are done in kindergartens, and primary schools, joinery work, etc. Apprentices in trades calling for great dexterity must have good teachers. To have such trades full of workmen is the sign of high culture for a nation. Every calling which has no apprentices, or only mediocre ones guided by poor teachers, is doomed to decadence.

Lessons from the War in the Care of Industrial Injuries of the Extremities. David Silver,[4] makes a plea for early efficient splints to bone injuries of industry, as the mortality from fractures of the femur in military service was reduced from 80 per cent. to 40 per cent. by early efficient immobilization.

In amputations definite improvement has been made along three lines—the care of the stump, the use of temporary appliances and training in the use of the artificial limb.

Treatment of the stump is indicated: (1) to hasten absorption; (2) to prevent formation of exostoses or limit them to less harmful locations; (3) to prepare the stump tissues for the new function of weight-bearing; (4) to guard against the development of limitation of motion and of deformity; (5) to limit muscular atrophy and to preserve coördination in the muscles controlling the joints above the site of amputation.

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(4) West Virginia Med. Jour., September, 1919.

The measures necessary to meet these indications are: bandaging, massage, hydrotherapy, exercises and the early application of some form of temporary limb. The object of bandaging during the first few months is to prevent congestion and swelling.

Massage may be begun above the dressing from two to three days after operation in amputations below the knee. The stump itself when healed may be massaged—the depth and force of the massage increasing as the tolerance of the stump permits.

Hot packs promote circulation and hasten absorption.

Three types of exercise are valuable: (1) pressure which checks formation of exostoses and prepares the stump for weight-bearing; (2) passive movements are necessary from the first to prevent limitation of motion; (3) active movements prevent limitation of motion and atrophy of disuse, which are two of the chief causes of discouragement, when the use of an artificial limb is begun.

Military experience has fully demonstrated the great value of the use of a temporary artificial limb, which gives a better functioning stump, the period of incapacity is shortened and the morale of the patient is improved. The best temporary limb is the simple peg-leg with the plaster-of-Paris socket, as it is light, comfortable, simple and easy of construction. In the satisfactory flap amputation, the use of such an appliance can be begun within ten days of the healing of the wound. It is worn at first for periods of a few minutes, but the length of time and frequency of application may be increased in successive days.

Occupations Suitable for War-Cripples. Having made some investigations on this subject, the results are announced by MM. Gourdon and Dijonneau.[5] They were especially interested in the calling of a millwright, and found that subjects with one leg amputated, those with shortening of the limb or with paralysis of the terminal ends of sciatic, and with suitable apparatuses are entirely capable of this work. After loss of a forearm,

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(5) Bull. de l'acad. de méd., Oct. 7, 1919.

or a hand, pseudarthroses of one of the bones in forearm, or ankylosis of elbow at obtuse angle, only part of the work can be done—use of file, chisel, hammer, scraper. After amputation of the arm only the file and chisel can be used. When there has been resection of the wrist with resultant flail-joint, or pseudarthrosis in the forearm, the only tool capable of use is a file. The estimation of the capability was based on three factors: quality of work, length of time necessary, resistance to fatigue.

The authors conclude that after certain serious mutilations, even amputation of an arm or forearm, the men turn out as good work as anyone, without undue fatigue, but taking much longer. Subjects who have had thigh or leg amputations, or some lesion crippling the lower limb, can be educated or readapted, provided they are able to stand. Loss of an arm, however, produces an enormous decrease in functional capacity, it takes too much time and too great mental effort to learn. Former millwrights may still pursue certain parts of the work, provided they are fitted with artificial hands or forearms. Again, such individuals, even with serious lesions of the upper limbs, may still be useful as foremen or superintendents.

A Glance at German Prosthesis. In January, 1919, C. Roederer[6] was placed in charge of the Center of Prosthetic Appliances of Alsace-Lorraine, and remained at its head until September. He contributes some observations made on the appliances he saw.

Roederer begins by observing that the German flatters himself on being an implacable logician. Unfortunately the type of logic is unaffected by elegance, beauty or even physiology. He pushes a system to an absurd degree. He multiplied joints to accommodate all the subtleties of movement, was prodigal with metal, trying to satisfy all the needs, producing in some instances, artificial arms, which were utterly incommodious, monstrous as regards weight, and which a Hercules alone could use with freedom. With that race, the mechanician was often in need of a physiologist.

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(6) Presse méd., April, 1920.

Lower Limb: The German populace being mostly engaged in commerce and factories, had different needs from the one in France, two-thirds of whom were agriculturists. To replace a lost leg, the peasant goes to the field with a peg-leg; the slight weight, the adaptability were all he looked for, the esthetic appearance was nothing. On the contrary, the man going to his office, store, or visiting clients, has need of some dissimulation. The Germans occupied themselves principally with esthetic locomotion.

Moreover, and this question should interest surgeons, while in France they gave up the idea of supporting all or even part of the weight of body on most of the stumps of lower limbs, in Germany—owing to the influence of Bier and of Bunge—the termination of the stump continued to be the object of investigations.

Diverse means of osteoplasty were proposed, the object of each being to transform the bone ends into a smooth and painless club-shaped extremity. But Bier announced as a postulate, that the complement of operation should be early locomotion, the almost immediate use of the stump. Hence, as Spitzy did at Vienna, all the German orthopedists began to use an apparatus for early walking, occupying themselves with training the stump of leg and a methodical study of walking. As soon as possible after amputation, the man was provided with an appliance usually made after Spitzy's model, a plaster cuff surrounding the stump and two splints forming a stirrup, and carrying the weight of the limb to the ground.

Upper Limb: Here the Germans seem to have abandoned more quickly than the French the illusion of an anatomic limb. Their different ''parade-arms'' were practically the same in both nations.

The principal characteristic of the German prosthesis, and the only real difference from the French was the cinematization of the stumps, resorted to principally for the arm. The mechanism of the apparatus proposed was generally very complicated. The aid of the mechanician should reinforce the surgeon's art and assist it, and many poor results complained of by the patients do not invalidate the conclusion of Sauerbruch, but prove the mechanician employed was unskilled. Roederer saw a few cases, but the results did not seem to compensate for the time consumed and the patience of the soldier. The best ones were in the forearm, but the amplitude of motion was insignificant, the force produced was absolutely insufficient for hard labor. The rapidity of motion as well was too slight to permit skilful movements to be made. It is scarcely to be expected that much progress in this line can be hoped for.

The final summing up of Roederer is that the Germans were inferior to the French in prosthesis of the lower limb, but superior for the upper one.

The Tripod Method of Walking with Crutches. Complete paralysis of both lower extremities is not necessarily a bar to some form of ambulatory activity, says R. W. Lovett.[7] After the treatment of a fairly large number of long-standing cases of very low grades of power in the legs, hips, abdomen and back, it was possible to teach walking, rising and sitting down in a chair and walking up and down stairs. Lovett feels that in flaccid paralysis of the lower extremities a patient of average intelligence with one good arm and one arm good enough to hold a crutch can be taught to walk. provided the deformities of the hip, knee and ankle have first been corrected. The adoption of the tripod method of walking constitutes the difference between independence and dependence in the life of the affected individual.

INJURIES AND DISEASES OF THE SPINE.

Rapidly Fatal Spinal Caries. This article is by J. Rupert Collins.[8] Three robust-appearing, previously healthy soldiers, who had been in active service for from six months to two years and three months, began to complain of pain in the back and chest, followed in a few days with paralysis of legs and loss of reflexes. Temperature ran high and the patients became delirious. One man died after an illness of six days, one after fifteen days, and the other after nine days.

In each case postmortem examination showed lung

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(7) Jour. Amer. Med. Ass'n., May 8, 1920.
(8) Brit. Med. Jour., Aug. 30, 1919.

tuberculosis, pleural adhesions, caries of a vertebra and purulent fluid around the cord.

The author reports the histories, clinical course and postmortem findings of each case in detail.

Sacralization of the Fifth Lumbar Vertebra. Delherm Rozat and Chaperon[9] cite details of four cases presenting painful manifestations in the sacrolumbar or sciatic regions. They emphasize the fact that when such painful phenomena are encountered, an examination should be made with the *x*-rays; this may show that the pain is caused by more or less abnormal development of one or both of the transverse processes of the fifth lumbar. When this is present, some form of operation may be indicated as advised by Mauclaire.

Symptoms Due to Sacralization of the Fifth Lumbar Vertebra. In their discussion of this subject, Nové-Josserand and Rendu[1] state that the anomalies of the "transition vertebrae" have attracted the attention of anatomists for many years; then they were studied by obstetricians; and of late orthopedic surgeons have found that they may play a part in producing certain forms of scoliosis.

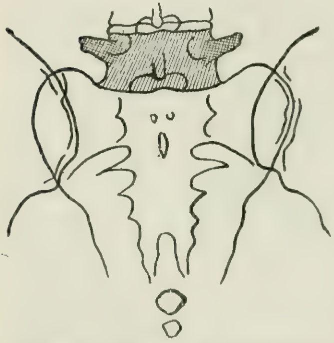

Fig. 1. Tracing of radiogram normal fifth lumbar vertebra.

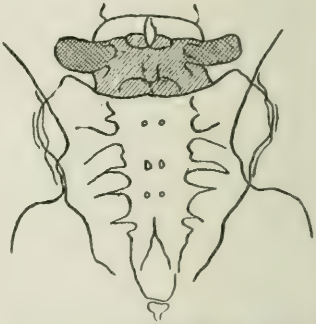

Fig. 2. Hypertrophied transverse processes of fifth lumbar.

In 400 radiograms of the pelvis taken at random, Rossi found seven with this sacralization, and in 800 subjects

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(9) Presse méd., July 24, 1920.
(1) Presse méd., July 20, 1920.

with lumbar pains due to various causes, he believed in twenty-two that the neuralgia might be attributed to the same cause. This frequency was corroborated by the authors, who collected five examples in a short time, and in a series of pictures of the pelvis, mostly from patients with renal disease and supposed to have calculi, found fourteen more.

Bilateral symmetrical	6
Bilateral asymmetrical	8
Unilateral (right, three; left, two) (19)	5

In the twenty-two cases of Rossi, the nature was:

Bilateral symmetric	12
Unilateral (right, three; left, five)	8
Combined with rachischisis (22)	2

Pain is the principal manifestation, though it is not invariable. It manifests itself, as a rule, between the ages of twenty and thirty. The site varies, nearly all patients complain of lumbar pain, but many have radiating pain as well; in fact, in some patients the latter predominates. The pain in the lumbar region is generally toward the base of the sacrum—median in the symmetrical type and to one side in the unilateral variety. In the latter event it is near the sacro-iliac joint and almost invariably on the same side as the deformity.

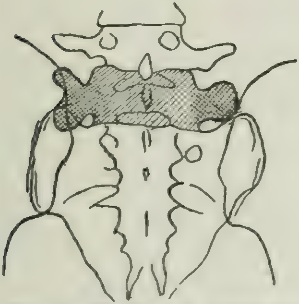

Fig. 3. Tracing of radiogram, showing hypertrophied transverse processes in relation to iliac bones.

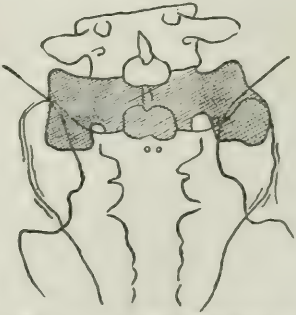

Fig. 4. True sacralization of fifth lumbar.

It is known that cervical ribs by compressing the nerve trunks may set up not only neuralgia, but even neuritis, and it seems that this may be the case as well in the lumbar region where the relations of the nerves to the bones are still closer. However, if this be true operation should give relief, and this is not the case.

It may be asked then if there is no other factor. During the development of the spinal cord, the latter ascends, *e. g.*, the conus terminalis in the child is at the third lumbar, but in adults it is between the first and second. It is possible that sacralization of the fifth lumbar may be accompanied by some disturbance of the relations between the cord and spine capable of setting up traction or compression of the nerve roots without any direct relation to the hypertrophy of the transverse process (Figs. 1 to 4).

The question of treatment is still undecided. American surgeons on four occasions have resected the transverse process at fault. Rossi, believing the trouble was mostly in nerves, used physiotherapy and the continuous current, obtaining what he judged to be sufficient improvement.

Operative measures have not given decisive enough results to warrant use in every case. The cases with progressive neuritis should, no doubt, be subjected to intervention. As a rule, patients are not incommoded enough to be willing to undergo operation, especially as they can not be promised relief. They are satisfied to be assured they have neither Pott's disease nor sacrocoxalgia necessitating prolonged immobility, and that they can continue their avocation without fear of the condition growing worse.

The Scoliosis Due to Infantile Paralysis. According to Aurel, Babes and Buia[2] in these deviations of the spinal column, the bony elements play a part as well as the muscular ones. The direction of the curve is given, not only by the paralysis of the spinal muscles, but also by atrophy of the vertebrae. This was the condition in two cases cited by these authors. In neither was there any paralysis of the muscles in the spinal grooves, but the atrophy of the vertebrae set up a curve with the concavity on the atrophic side. The authors emphasize the importance of radiography of the spinal column.

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(2) Gaz. des Hôp., Jan. 13, 1920.

This clears up the mechanism of the curves in these cases of scoliosis following infantile paralysis.

[It may clear up the mechanism, but it does not clear up the question of treatment. We all know how difficult it is to prevent or to improve the scoliosis due to infantile paralysis. Many so-called paralytic scolioses are not caused by actual paralysis of the muscles of the spine, but are due to shortness of a paralyzed leg or to flexion deformity at the hip, uncorrected or unequalized. Even after correction of such leg deformities, it is often with the greatest difficulty that the spine can be straightened and kept straight. It is likely that the best treatment in cases of actual paralysis of the spinal muscles is the ankylosis, by operation, of a sufficient number of vertebrae to prevent serious deformity. The fusion method of Hibbs is probably preferable to Albee's bone-graft, since it more certainly prevents rotation in children. No operation should be considered in any case until conservative methods have been faithfully tried; and, if operation be found advisable, it should be preceded by forcible correction until the spine has been made as straight as possible.

The atrophy and change in shape of the vertebrae mentioned in the article above abstracted are the result of the scoliosis, and not the cause of it. In other words, the bony changes are secondary, and not primary.—Ed.]

Fracture and Dislocation of Dorsal Spine. With Complete Rupture of Cord. This case is reported by R. Hertzberg.[2]

April 17, 1918, the patient, a young man 26 years of age, fell backward off a building and struck on a pile of rocks twenty feet below. Examination showed marked bony deformity over the lower dorsal spine, with discoloration and swelling. There was complete paralysis and anesthesia below the site of injury.

As soon as the patient's general condition permitted, operation was done. The laminae of the ninth and tenth dorsal vertebrae were found fractured and driven into the spinal canal, both spinous processes were found broken off at the junction with the laminae. The body of the tenth vertebra was split in half. Below the ninth

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(2) New York Med. Jour., June 14, 1919.

vertebra the spine was driven forward. The articular processes were not fractured, but torn away from them. The spinal canal seemed empty except for blood clot and some glistening tissue along the anterior wall. The fragments of bone and the clot from the canal were removed. The glistening structure was the cord which had been stretched out at the time of the fracture.

By careful traction from shoulders and feet and by manual manipulation of the broken and dislocated vertebrae, a perfect reposition was obtained. With chest flexed backward a cast was applied from forehead to pelvis. The patient left the operating table in good condition, but convalescence was stormy. After ten days a severe cystitis developed and lasted for five months. From two weeks after operation for about five months there was a riot of gangrene, dead bone, and sloughing tissue. Wherever there was the slightest undue pressure there was death of tissue.

The cast was removed after about six months. There was no improvement in the paralysis and neither hips nor knees could be flexed to the sitting position. The problem now was to get the patient out of bed. A ladder was fixed above the whole length of the patient's bed at a height which he could just reach with his hands. By pulling himself this way daily the strength in arms and trunk increased rapidly and the joint contractures were soon loose enough to allow him to sit up. Eleven months after the accident he stood on his feet for the first time. Later, with the aid of hip braces, an ambulatory splint, and a sort of bird cage around him, the man learned to push himself around the ward and hall. Control of bladder and bowels was regained. Next he was given crutches, and after overcoming his fear of falling he began to progress with them.

Now, about two and a half years after the injury, the man is absolutely paralyzed from the lumbar region down, with practically complete anesthesia. Yet he is able to go up and down stairs, get in and out of bed alone, can dress himself, and with the aid of crutches, is enabled to go almost anywhere he pleases.

Fracture-Dislocation of Cervical Spine in a Child. J. G. Edwards[3] reports a case in a child aged 4, of frac-

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(3) Med. Jour. of Australia, April 13, 1920.

ture of the odontoid process of the axis with forward dislocation of atlas on account of its relative rareness in children as well as the interesting fact that during anesthesia for reduction, the anesthetist unintentionally reduced the dislocation by pushing forward the lower jaw. The patient made a good recovery.

Compression Fracture of Vertebral Bodies with Delayed Symptoms (Kuemmel's Disease). Kuemmel's disease, says Robert Baker,[4] is characterized by (1) spinal injury, (2) temporary symptoms of short duration, (3) no local evidence of importance, (4) subsequent delayed symptoms of pain, disability and local evidence of bony injury (notably, kyphosis).

After the disappearance of the first disability, a matter of a few days or weeks, the patient develops pain in the back at the site of the injury, and progressive disability. Local tenderness is found over one of the spinous processes, and a kyphosis gradually appears, with limitation of motion.

Kuemmel, who described the condition in 1895, at first considered it a traumatic osteo-arthritis, but later thought it to be a type of fracture of the spine. The present view is that there is a type of compression-fracture of the vertebral bodies which is at first benign and can not be discovered by the *x*-rays, but which later begins to show symptoms and signs. The prognosis depends upon the time when the diagnosis is made and the treatment is begun. After any severe spinal injury a guarded prognosis should be given, and the case kept under observation. When a lesion is found, adequate fixation should be used for a long period of time. Conservative surgeons advocate plaster-of-Paris jackets, and the more radical advocate a bone-grafting operation.

[It is difficult to understand why there is so much confusion as to the pathology in these cases. The condition is very simple: a vertebra has been compressed sufficiently to break some of its vertical trabeculae without causing enough change of outline to register in the *x*-ray plate. The immediate pain and disability keep the patient quiet for a short time. When he begins to walk again, the weakened vertebral body is unable to carry the superincumbent weight, and it gradually becomes compressed. Each vertebra has a certain amount of residual elasticity, and can withstand slight momentary compression (enough to break a few trabeculae) and yet return to its normal outline. If now it can be protected from stress until the trabeculae have regained their normal strength, no damage will result. If, on the other hand, too much weight be placed upon it before complete repair is established, the symptom-complex described by Kuemmel may eventuate. It should not be called Kuemmel's disease, since it is not a disease.

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(4) Surg. Gynec. and Obstet., October, 1919.

Prolonged treatment by braces or plaster jackets will give relief, and in some cases complete cure, but it usually requires three years or more. The symptoms can be relieved in a much shorter time by a bone-graft or bone-fusion operation (Albee or Hibbs). The Editor has performed eight or nine Albee operations for this condition with complete relief in all but one case, where many months after operation the man fell and broke the bone-graft and had a return of all his former symptoms. —Ed.]

Treatment of Pott's Disease by Albee's Method. In his discussion of this topic, P. Barbarin[5] states his conclusions are based on a case of undoubted cure dating back six years (Figs. 5 and 6), and on six other cases in which he operated in 1919.

Does Albee's operation lead to very rapid cure? Put in this manner, he observes, the question can not be answered for many years. We know it takes a long time to cure a tuberculous lesion of bone, no matter where located, and a great many cases will be necessary to ascertain whether these tibial grafts prevent complications, *e. g.,* abscess, which indicates progress of the disease.

As a matter of fact, the question should be propounded thus: Does the operative treatment do away with prolonged immobilization in a plaster cast?

The plaster jacket, which tortures uninterruptedly for many years, has always been—and can only be—but a stopgap. Its inconveniences are considerable, its ad-

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(5) Progrès méd., Jan. 25, 1920.

vantages problematic. While in treatment of tuberculosis of bones we insist more and more on fresh air and especially the sun, these jackets impede heliotherapy when they do not prevent it altogether.

Heliotherapy is a very efficacious means of treating tuberculosis of bone in general and Pott's disease in particular, and the time required has been lessened. It is, however, insufficient, and in 1915 Barbarin said: "When we can not cure osteo-articular tuberculosis in a few days, the old form of immobilization is imposed as a necessary rule."

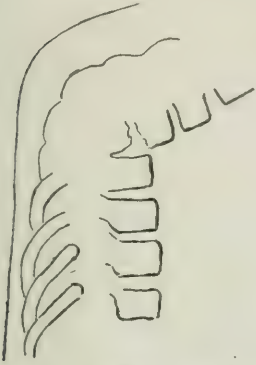

Fig. 5. Tracing taken before operation showing considerable destruction of upper dorsal vertebræ.

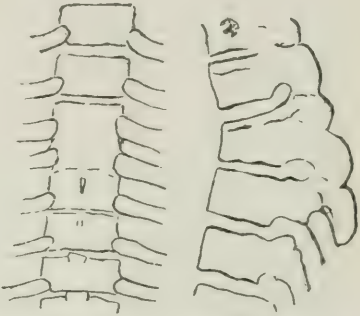

Fig. 6. Tracing (reduced) of the upper dorsal region, taken six years after operation.

At present, by utilization of spinal grafts from the tibia we have a rigorous method of fixing the spine at the diseased focus, while leaving the body of the child free and naked, exposed as a whole to the solar rays, which double the action of the local fixation. At the same time the length of the treatment is considerably lessened.

Barbarin believes such results justify his enthusiasm, allowing as the method does, the delivery of the little patients from their plaster prisons, and enabling them in a few months to resume a quasi-normal mode of life.

[Nearly all unprejudiced orthopedic surgeons who have performed considerable numbers of these spinal grafting operations have noted that very young children do not show as good results as the older patients. In analyzing such instances let us use two indices only, for the sake of simplicity: First, the progress of the disease; second, the progress of the deformity. During the last three years it has hardly been possible in the various clinics to pay as much attention to the keeping of records as was formerly the routine. It will be difficult to tabulate any long series of observations. Much of our information will have to come in the form of general impressions, and it will therefore not have the authority of exactitude. The impression is quite general that very young children on whom the Albee spinal-graft operation has been performed do not present the evidence of complete cure much more rapidly than those not operated upon. They do not gain weight perceptibly faster, they do not display less tendency to abscess-formation, and they are affected in about the same proportion with meningeal and lung manifestations. The general progress of the tuberculosis has not, therefore, been modified so much as we had hoped. It is our impression that the incidence of paralysis has been lessened. The second index, the progress of deformity, also shows disappointing results. Those cases in which the use of apparatus has been discontinued six months or a year after operation have all shown increase in deformity.

It is evident that the tibial splint in very young children is not able to withstand the constant strain placed upon it, and that it undergoes some form of adaptive structural lengthening, which, together with the lessened growth of the diseased vertebral bodies, produces or allows an increase in the kyphosis.

It is necessary, therefore, to be extremely conservative in statements to the parents of young children before performing the Albee operation. We must explain that a very long period of recumbency must follow the operative work, except in the few cases in which sufficient protection can be afforded by the use of braces or plaster jackets. It is likely that Barbarin's method will find wide popularity when it is more generally applied. This, in effect, is the performance of the Albee operation and the maintenance of prolonged recumbency in the direct rays of the sun. The results of heliotherapy as reported by Rollier, Freiberg, Campbell, and many others leave no room for doubt that sunlight exerts a powerful healing influence upon tuberculous joints. The greatest difficulty is that in most of our large American cities the number of sunny days in the winter and spring is very small, and the climatic conditions are very severe. Another difficulty is that very few of our larger hospitals have been designed with a view to heliotherapy. Barbarin's belief that apparatus may be omitted after the operation, provided recumbency be maintained, seems theoretically sound. We know that the Albee splint will not prevent increase in deformity in young children if they are allowed to go without protection, in the upright position, but it is highly probable that the splint will be entirely sufficient if weight-bearing be prohibited.

The question of the relative merits of the Albee and the Hibbs methods of fastening the vertebrae might well be discussed in this connection. The complete fusion of the laminae, articular facets and spinous processes which is produced by the proper performance of the Hibbs operation is a very strong argument in its favor in the class of cases under consideration. The only drawback is the length of time required by the painstaking technique. There seems to be little room for doubt that a complete fusion of the whole posterior portion of the spine must necessarily be stronger and more satisfactory than the mere fusion of the spinous processes. It must be granted that in the majority of older cases the Albee has been abundantly proven to be sufficient, but the Editor examined only the other day a soldier upon whom he had done an Albee operation in July, 1919, for the relief of a fractured spine, who eight months later fell and broke the Albee splint at its middle. The symptoms of pain on motion have been present since this accident, and the break in the splint has not united.

It would seem to the Editor that in small children the Hibbs technique should be preferred to the Albee, provided that the operator can do the work in a reasonably short time, in properly selected cases.—Ed.]

THE UPPER EXTREMITY.

Dislocation of the Shoulder Joint and its Treatment. This is a very common civil accident and an unsatisfactory one as regards the ultimate functional results. Many of these patients suffer prolonged disability; in some, partial disability is permanent; in nearly all, the course of treatment is unduly long. This means pain endured, time and money wasted. Keeping in mind all the disadvantages of strapping the arm to the side, A. H. Todd[6] put up two patients on the Middeldorf triangle. There was no apparent disadvantage to this, and abduction was more easily restored. In other cases the arm was still more abducted from the side, resting it on a rectangular wooden splint. Better still, is some form of molded half jacket to which is fixed at right angles a trough to support the arm and another trough to support the forearm, with a hinge-joint at the elbow. If the splint is applied within two days the desired abduction can be obtained easily. If the arm has been bound to the patient's side for some days, abduction should be made under anesthesia. Abduction offers the best possible chance of bringing the torn edges of the capsule together. In abduction, the muscles which extend from the trunk to the arm brace the humerus firmly up against the glenoid cavity, whereas in abduction they are more or less relaxed, and the head is less firmly held.

After reduction, daily massage greatly decreases pain and sleeplessness. At first no movement is allowed at the shoulder, but the rest of the arm is moved freely. After from ten to fourteen days the splint is removed, and the patient is told to carry the arm in a sling for a week or more, and to exercise the arm in all directions. A good plan also is to have the patient try to reach a little higher, every day, up a wall. The patient is not discharged until he can lift his hand quickly and painlessly up into the air and interlock his thumbs above his head.

Todd presents the following summary of his conclusions:

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(6) Practitioner, March, 1920.

The present after-treatment of dislocations of the shoulder by fixation of the arm to the side is irrational, unscientific, and in actual practice unsuccessful.

Limitation of abduction and osteo-arthritis are its results.

In rectangular abduction the rent in the capsule is closely coapted, whereas in adduction, the capsule is crowded together in a crinkly lump, and coheres in that position, thus limiting abduction and causing pain.

The arm is no more liable to re-dislocate when placed in rectangular abduction than when it is tied to the side.

If abduction is adopted, the resulting movements are much better; they are obtained much more quickly, and more painlessly.

These statements are based on facts, not on argument.

[This paper is sound and sensible. The use of an abduction apparatus will definitely shorten the period of disability and will bring about a more perfect result. To accomplish this abduction, the Army splint is efficient and comfortable. It is made of a strip of iron ½ by ¼ in., bent at a right angle, and long enough to extend from the crest of the ilium to the axilla and from that point to the elbow. At the elbow is a pivot to allow motion in the horizontal plane, and the iron continues to the hand. One or two broad bands of sheet metal are riveted to the upright and bent to fit the chest and pelvis, and are padded and provided with straps. One strap goes over the shoulder to support the weight. The arm rests in metal bands, padded, and likewise the forearm. Some of the patients preferred a short body-portion, only including the chest; and some were more comfortable with the lower end resting against the ilium. The Editor regrets that he does not remember the name of the designer of this splint. It was in every-day use at Fort Sheridan.—Ed.]

Tarsal Scaphoiditis in Children. This curious affection is discussed by A. Mouchet,[7] based on a series of three cases under observation: There is an osseous dystrophy involving the scaphoid bone alone, in children from five to ten years old and of either sex. There is no trace of rachitis, the little patients complain of some

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(7) Presse méd., April 17, 1920.

pain in the bone, especially toward evening, often there is a history of trauma, though this may be absent. The only clinical signs are slight swelling of the bone, and occasionally an equally slight atrophy of the muscles of the calf. The chief interest of the disease is the *x*-ray picture, this shows the bone flattened, atrophied, condensed, with true metallic opacity.

With rest, recovery is obtained in a few months. Successive radiograms prove the normal bony structure of scaphoid is regained in a year or so. Mouchet believes that there is no anomaly in development, but osseous dystrophy giving rise to a fracture by tearing, analogous to the coxa vara of adolescents.

[This is evidently the condition described by Kohler in 1908, and usually called Kohler's disease. An article by C. R. McClure in the *Journal of the American Medical Association,* Oct. 26, 1918, shows some excellent *x*-ray pictures. Hetzel also published a paper on this subject in the *American Journal of Orthopedic Surg.,* March, 1917, with pictures.

The opinion most generally held is that it is allied to the Legg-Perthes disease of the head of the femur—osteochondritis juvenilis—and that it is not tuberculous in origin. P. W. Roberts thinks that it is syphilitic. The really important part of all the discussion is that under rest and protection it gets well in either location in a comparatively few months, and that it must not be treated by operation.—Ed.]

Value of Posture in After-Treatment of Stiff Shoulder. The essential principle in treatment of shoulder joint injuries, says Charles MacKay,[8] is that they shall be placed in abduction, encouraging all voluntary movement, and that the patient shall be treated at the beginning in the lying-down horizontal position. This position helps considerably to eliminate two important factors—gravity and muscle spasm—which retard recovery of movement. In old-standing types of stiff shoulder one must gain the patient's confidence and place the affected muscles during treatment in such a position that their work begins at a minimum.

Where opposing muscles have become contracted and

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(8) Lancet, June 12, 1920.

shortened, or where peri-articular adhesions have occurred, the patient's vigorous voluntary efforts are the best means of gradually stretching the contracted opponents or breaking down the adhesions. The use of force under anesthesia may be essential if time is a factor, and if painful passive and active motions can afterward be borne by the patient; but MacKay believes that better results will be obtained if treatment on the above lines can be carried out gradually.

[The advice in this paper is sound, but it is too frequently impossible to persuade the patients to remain in the horizontal position. For such cases, one of the many abduction splints, such as the Army splint, will be found to give good results. There is a joint at the elbow, so that the arm and forearm muscles can be used freely, and gravity and muscle-spasm are no longer detrimental. —Ed.]

Habitual Dislocation of the Shoulder Joint. Robert Ollerenshaw[9] discusses a series of three cases with no recurrence. He advocates the use of the deltoid flap operation because of (1) muscle sling braces up head and neck of humerus; (2) muscle sling which contracts when the rest of the deltoid is inactive.

Technique is similar to that described by Clairmont in 1909. There are two stages of operation:

1. Anterior incision through the deltoid, division of the pectoralis major and exposure of the quadilateral space.
2. The patient is turned on the side; incision is made through the deltoid, 1½ inches anterior and parallel to its posterior border. The deltoid is split from its insertion to the point of entrance of the circumflex nerve and turned back. The outer head of the triceps is exposed, and fibers separated downward, thus leaving passageway for the flap. Forceps are then passed through from the anterior incision and the flap drawn through. Clairmont advocates sewing the flap to the edges of the split deltoid in front.

Ollerenshaw advises fixation of the flap to the anterior surface of the subscapularis tendon. This brings the flap in closer apposition to the capsule. It is important

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(9) Jour. Orthop. Surg., May, 1920.

to have the flap as long as possible so that there is no tension after suturing.

Treatment: Motion not to exceed 60 per cent. abduction the first month. Full range of motion to be taken in two months.

Pathology: No bony changes were observed by Ollerenshaw as described by Thomas. There was marked synovial prolongation along the biceps tendon in one case.

Ollerenshaw concludes that the primary consideration is one of loss of muscle balance; capsular laxity.

Treatment of Pseudarthroses of the Humerus. Speaking at the Paris Surgical Society, Rouvillois[1] said that in a case high up in the bone, with osteoporosis and extensive loss of substance, where metallic synthesis was impossible, he resorted to Heitz-Boyer's plan: A piece of dead beef-bone was inserted in the medullary canal long enough to fill the gap, and held in place by projections at each end of the graft. In addition some osteoperiosteal grafts were taken from the patient's tibia, and several chips between the two groups of grafts. A good result was obtained. In three months the humerus was as long as that of opposite side. When last seen, nine months later, the patient's arm was very solid.

In the discussion, Alglave insisted on the utility of strict plaster immobilization to perfect the results.

Mauclaire said that he had had a good result in a similar case, by sharpening the end of the lower fragment and implanting it in the humeral head.

Dujarier believed that while the procedure was somewhat complex it seemed the only way to avoid considerable shortening, and the result was admirable.

Jacob also advised a simpler method, and did not believe the pegs on the end of graft to retain it in position were advisable.

Rouvillois answered that he had used a moulded silicate splint for immobilization. The plan suggested by Mauclaire was out of the question in this case owing to the huge gap. Lastly the graft was so long it seemed necessary to have the pegs on ends to keep it in place.

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(1) Presse méd., April 17, 1920.

Operative Treatment of Paralytic Conditions of the Upper Extremity. The essential requirements of function of the upper extremity, according to A. Steindler,[2] are: Active abduction, or a position of abduction of the shoulder, the ability of flexion in the elbow, the ability of pronating the forearm, of hyperextension, either active or passive, of the wrist and active flexion of the metacarpo-phalangeal joints, free play of the fingers and the power of opposing the thumb to the fingers.

The problems considered, are:

1. To procure abduction of the shoulder.
2. To procure position of flexion in flail elbow.
3. To overcome flexion contraction in the wrist and substitute for it stable hyperextension.
4. To overcome the claw-hand deformity, and secure flexion motion of the metacarpo-phalangeal joint.
5. To procure for the thumb power of opposition and active extension.

Flail Shoulder: This is often accompanied by subluxation of the humerus. If the triceps muscle is intact, stabilization of the head of the humerus in the socket can be accomplished and some patients are able to effect some abduction of the shoulder by contraction of this muscle, which presses the head against the glenoid cavity. The indication in cases of flail shoulder is arthrodesis, through a horseshoe incision circling the acromion. The acromion is cut through one-half inch from its edge and the deltoid with the acromial insertion is turned down. The raw-bone surfaces are united with wire or strong catgut sutures. The capsule is reefed and closed. A platform splint is used.

Flail Elbow: The incision is made on the inner side of the humerus around the internal condyle. From the muscles arising from the inner condyle a flap is carefully dissected, avoiding the ulnar nerve. This flap is then, under flexion of the elbow, fastened to the median portion of the intermuscular septum two inches above the elbow joint. Through an incision on the outer side of the arm, dissecting the extensors carpi radiales free

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(2) Jour. Orthop. Surg., October, 1919.

from their origin and fastened in a similar manner two inches higher up. This operation will cause the flexors and extensors of the wrist to act as flexors and extensors of the elbow. These patients should wear a splint with a stop-lock not allowing extension over 90 degrees.

Drop Hands and Flail Wrists: In cases of flail elbow where some of the flexors and extensors of the wrist are to be made available for elbow action, stabilization of the wrist is also one of the mechanical requirements.

Technique: A short incision is made over the dorsum of the hand between the extensor pollicis longus and extensor indicis. One proceeds directly to the carpal joint without interfering with tendons or their sheaths. The joint is opened, part of the radius and of the scaphoid are scooped out. Capsule and fasciae are sutured and the wound is closed, the wrist being placed at once in a cock-up splint. The result is not a complete arthrodesis but rather a very limited motion of the wrist.

Tendon Transplantation. In five cases the interosseous route was used in carrying the flexor carpi ulnaris forward to the extensor tendon. The flexor carpi radialis, when used, was carried around the outer side of the radius as advised by Sir Robert Jones. The tendon of the flexor carpi ulnaris is brought through the interosseous membrane at the upper border of the pronator quadratus. The ulnar nerve and artery are retracted radially, the tendon is sutured lengthwise in two strips to the extensors of the finger.

Two Cases of Curved Radius. These cases under the observation of de Géry and Colombier,[3] were in women, aged 70 and 62, respectively. The authors insist on the utility of stereoradiograms in studying osteo-articular deformities, these means alone, they assert, enable one to appreciate the morphology and relations of bony elements situated in different planes. The essential features of curved radius are: double incurvation (sagittal and frontal) of the lower end, posterior luxation of the upper extremity, upward and forward displacement of the first row of carpal bones, which has a cuneiform aspect, and hyperextension of the second row and the metacarpals.

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(3) Presse méd., July 24, 1920.

End-Results of Resection of the Wrist. As a member of the Rehabilitation Commission, P. Desfosses[4] examined all the records of such resections to be found in 1918, and did not find a single end-result which could be called good. He remarks that all the cases examined were operated on early in war, and that possibly the results in the last years may be better, owing to progress in technique. He cites several typical examples:

Case I.—Removal of entire carpus, the lower ends of radius and ulna: The report stated that there was a flail-joint, the hand being useless. The fingers were stiffened in extension; the only motion possible in the hand was very slight abduction and adduction of the thumb, the other fingers were absolutely inert (Fig. 7).

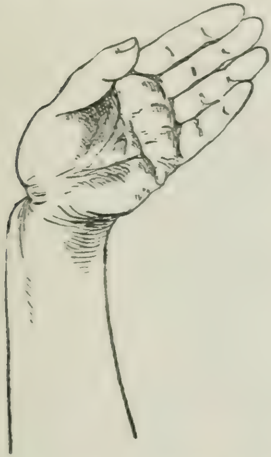

Fig. 7. Case I. Wound, March, 1915. Complete resection of wrist, hand useless.

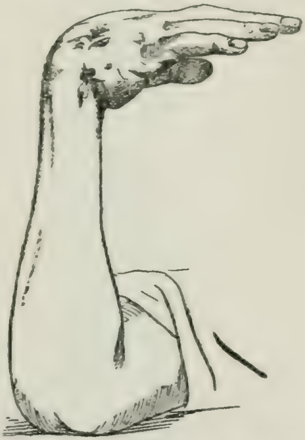

Fig. 8. Case II. Wound, in 1914. Hand ankylosed in flexion on wrist.

Case II.—The result in this case was even worse, if possible—the hand being ankylosed in flexion on the wrist. There was no motion whatever in the fingers. The resection was confined to the carpal bones, the bones of the forearm had not been excised (Fig. 8).

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(4) Presse méd., July 14, 1920.

Case III.—Another bad result: The left carpus was excised with the exception of the pisiform; the third metacarpal was also removed. The hand was shortened two inches; the middle finger was retracted 2.8 inches. There were deep and adherent scars on the back of the hand, and there was pronounced and definitive limitation of flexion of fingers and wrist.

Case IV.—Free resection of lower ends of bones of forearm, carpus left intact: In this case the hand was relatively useful. With a support holding the hand in good position the useful movements of prehension could be carried out (Figs. 9 and 10).

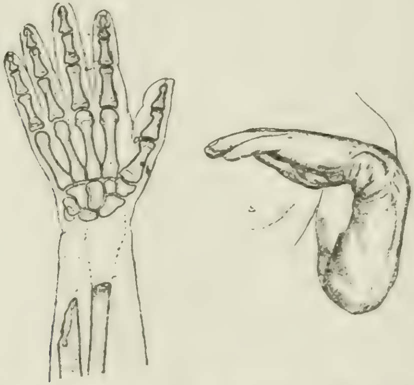

Fig. 9. Case IV. Excision of 2.8 inches of radius and 4.4 inches of ulna. Fingers in permanent extension.

Case V.—Man with shell wound, comminuted fracture of bones of forearm, calling for resection of lower end of ulna and nearly all carpal bones: There was flail hand strongly turned inward; thumb and index finger were stiff and extended; the other fingers were semiflexed. Grasping was nearly abolished, though slight prehension was possible. Vast cicatrices were adherent to the bones on the dorsum of the carpus and the base of the thumb. There were trophic disturbances of the hand (cyanosis, hypothermia), but no nervous lesions.

The poor results in resection of the wrist can be readily explained by the intensity of the infectious phenomena invading the tendon sheaths in the fingers.

Case VI.—The only instance of non-traumatic arthritis requiring resection discovered, was a soldier cared for in December, 1915, for syphilitic manifestations, in the course of which a white swelling of the wrist necessitated resection in the following January. The trapezius, pisiform, and lower end of radius and ulna were left. In 1917 the man had stiffness of all the fingers, the pulp in extreme flexion could not be brought closer than two inches from the palm, though all motions of the thumb were intact. The commission estimated the reduction of the working capacity at 30 per cent.

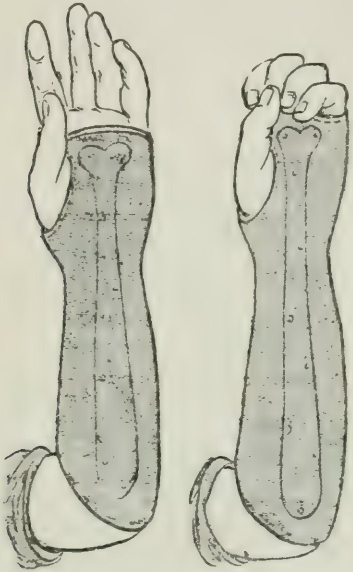

Fig. 10. Same. With aid of supporting apparatus patient could carry out a few movements of prehension.

Desfosses adds that the great danger in these resections is the stiffness of the fingers. All that Farabeuf pointed out in 1909 still holds good: Necessity for preserving the vessels and nerves, the tendons, muscles, the periosteum, the need for *daily gymnastics, both active and passive,* of combating the muscular atrophy. Surgery, writes Desfosses, does not consist merely of cutting and then sewing up; in orthopedics every surgeon must work in conjunction with a kinesitherapeutist.

[If all cases of excision of the wrist were allowed to develop such flexion deformity as is shown in Desfosses' pictures, the operation would not be justifiable; it would be better to amputate. It is absolutely necessary to dorsiflex the wrist and to keep it dorsiflexed, in all cases in which the wrist is stiff or partially stiff. The fingers should be used as freely as possible during the healing process.—Ed.]

Tendon Anastomoses for Radial Paralyses. It is very difficult, according to Mauclaire,[5] exactly to appreciate the value of all the plans which have been put to use.

Simple osteoperiosteal or intra-osseous tenoplasty of the extensor tendons (Galli-Putti operation) is insufficient. While lifting up the hand it does not permit any movements. Shortening of the dorsal tendons is insufficient for the same reason.

Fixation of the flexor tendons of fingers on the extensor tendons through the interosseous space sacrifices too much of the anterior muscles of hand. Elongation of the tendons of the anterior muscles and passage of one end to the dorsal region, he believes to be not enough, for the muscular fasciculus is already weak and with difficulty fills the antagonistic functions.

Jones' technique is very seductive—fixation of the pronator teres to the radial tendons, and transplantation of the flexor ulnaris and the palmaris longus on the extensor tendons. Hoffa's method is equally very logical—transplantation of the flexor ulnaris and the palmaris longus to the shortened tendons of the extensor communis. This was nearly the same as done by Mauclaire without being aware of it. He modified it by also transplanting a small portion of the palmar aponeurosis (Fig. 11).

The immediate results of these tendon anastomoses are very good. In Mauclaire's cases, patients were able in

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(5) Presse méd., Sept. 11, 1919.

a few days to try some extension of wrist, and of the first two phalanges. The end-results were also satisfactory. The hand remained well elongated, and the extension was quite enough. Flexion, on the other hand, did not always become complete again. This was due to the resistance of the sutured tendons, it takes time for them to become long enough. Stiffness in the finger joints may also be responsible. Movement of the thumb was evidently very limited, especially abduction.

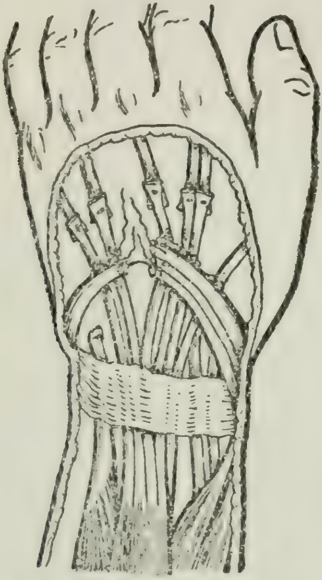

Fig. 11. Tendon anastomoses.

The cerebral motor centers easily adapt themselves to the new functions of the muscles.

It is possible that the tendons sutured and shortened may lengthen too much, but Mauclaire has seen no such case as yet.

Such tendon anastomoses, he thinks, are preferable to a simple grafting of a fragment of fascia lata fixed to the dorsal surface of wrist and finger, the hand kept in extension. They seem preferable as well to arthrodesis, either simple or combined with transplantation of tendons. Finally they are decidedly better than orthopedic apparatus, no matter how perfectly constructed.

[It is difficult to see why Mauclaire prefers his own technique (illustrated in Fig. 11) to that of Sir Robert Jones. It is entirely unnecessary to shorten the extensor tendons, as Mauclaire apparently does, and it is likely to do harm. It is difficult also to understand how he could drag down the cut tendons of the palmaris longus and the flexor ulnaris to the position shown in his picture.

The Jones operation for musculospiral (radial) paralysis has proved so successful in the hands of so many individuals that it is here detailed:

"With the forearm midway between pronation and supination, an incision is made along the radial border of the forearm in its middle third. Under cover of the tendon of the brachio-radialis, the pronator radii teres is found at its insertion into the outer border of the radius. From this it is detached, and it is then inserted into the tendons of the extensors carpi radialis longus and brevis, which lie closely applied to it on the dorsal surface. A horseshoe incision, with the convexity resting on the back of the carpus and its two straight sides extending along the radial and ulnar borders, is then made. Through the lateral aspects of this incision the tendons of the flexor carpi ulnaris and radialis are identified and detached from their insertions, as near the carpus as possible. The tendons are brought around the ulna and radius respectively in very slanting fashion, and are then attached to the extensors of the fingers and thumb, the carpi ulnaris being attached to the tendons of the three inner fingers, and the flexor carpi radialis to those of the thumb and index finger."—Ed.]

Autoplasty and Transplantation for Mutilations of Fingers, Particularly the Thumb. In discussing this topic C. Lenormant[6] points out that these mutilations are common, while carbolic gangrene formerly an important factor, is no longer seen; the increasing accidents from machinery often cause them, as do the too-

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(6) Presse méd., April 17, 1920.

frequent cases of ill-cared-for felons. Of course, besides these causes in civil life, an enormous number in all belligerent countries followed the war.

Every mutilation of a finger lessens the functional value of the corresponding hand. However, there are vast differences in this respect, as regards the extent of the mutilation and especially the finger involved. Here the thumb takes first place, its loss is the most serious functional defect, one of the two points of prehension being abolished, its loss is as grave as that of all the other fingers. There is considerable diminution of working capacity, and most of the ordinary acts of life are impossible. In the past the tables of indemnity for this mutilation have varied from 25 to 55 per cent. The French table of 1919 for war cripples places loss of ungual phalanx at 10 per cent., 20 to 30 for amputation of both phalanges, and 25 to 35 for loss of thumb and metacarpal bone.

However, the hand is not entirely useless after loss of the thumb. When the first metacarpal bone is intact and preserves all its mobility, especially where a rudiment, no matter how small, of the first phalanx is attached, it can still oppose the flexion of other fingers to some degree. The patient can not grasp small objects which are difficult to hold, but he can obtain a rather good hold of some coarse tool. To obtain this two essentials must be present: The metacarpal must be mobile, and the skin on the end of the stump must be thick and insensitive. It often occurs that the covering is thin, fragile, painful, liable to friction and shocks, sometimes ulcerated. Or, as the consequence of complex and extensive traumas (war wounds, crushes), or the consecutive infections, cicatricial bands may be left fixing and immobilizing the metacarpal.

In either case, it is possible by relatively simple operations, to remedy these inconveniences and make the stump tolerant and mobile. When the scar is insufficient and painful, and all the more so if the exposed end of bone protrudes through an ulcer, it is readily covered in by a good-sized flap from the wall of the thorax or abdomen. When the metacarpal is immobilized by retraction and by cicatricial bands, its usefulness can be restored by dividing the bands, separating the bone from the rest of the metacarpus, and covering the raw surface with flaps either from the stamp itself or from a distance.

Over twenty years ago, Nicoladoni attacked the difficult problem of dactyloplasty. He had the merit of originating the two methods by which reconstruction of a missing finger may be essayed: (*a*) Autoplasty, making the finger by a flap of skin taken at a distance and inserting a fragment of bone for rigidity, taken from any point whatever. (*b*) Transplantation, a finger or toe—soft parts and bone—was transported to the stump of the metacarpal.

On three occasions he treated as many subjects with complete destruction of the thumb, one from trauma, the others from carbolic-acid gangrene. Though he could carry out only the first stage, taking a flap from the skin of the thorax, it was intended to complete the operation by inserting a fragment from the tibia, but this was declined by the patients who were satisfied by having a well-protected stump. As a consequence, Nicoladoni decided that to prevent such misunderstandings it would be well to do the whole operation at one stage.

This suggestion was forgotten and not till 1919 were there any new applications, reconstruction of thumb (Cotte), and of finger (Albee). All these three operations were successful.

So far, nine transplantations of a finger or toe have been done (six of thumb). In two cases more or less failure followed from gangrene of the graft; in the remainder it lived. The morphologic result, very mediocre for the thumb with second toe, was very satisfactory with transplantation of the great toe and fingers. The functional results varied, often hampered by ankylosis of the flexor tendons, and it seems one can not rely on active motion of the interphalangeal joints of the grafted segment. Nevertheless, all his patients obtained great improvement in prehension after the graft, and in two cases, in 1911 and 1918 respectively, the success was remarkable.

THE LOWER EXTREMITY.

Late Sudden Death After Fractures of Lower Limb. Details are given by R. Villar[7] of three patients who died suddenly, six, fifteen and forty-five days respectively, after the injury. The first was a simple fracture of the leg, the second a compound fracture of the metatarsus, the other was a compound fracture of the leg.

All three patients were male adults, robust, and with no family or personal history leading one to suspect the fatal issue. No cardiac, respiratory, hepatic or renal lesion was appreciable. In each instance death was almost immediate without any premonitory manifestations. While no necropsy was possible, Villar believes that fat embolism was not the cause, but emboli detached from thrombosis.

As a result of his experience he believes one should beware of edema which does not yield to the usual measures, since this is an indication of venous thrombosis. Even when edema is absent, the possibility of thrombosis and possible migration of clots should be borne in mind. To avoid, so far as possible, dislodging the clots, no intemperate maneuvers should be carried out, either in reducing the fractures or in immobilizing them. It is best, he cautions, to be prudent in giving certificates in workmen's indemnity cases. However, in spite of all precautions an unsuspected clot may suddenly produce disastrous consequences before which the surgeon is powerless.

The Anatomic Conditions in Snapping Hip. These conditions are discussed by A. Mariau.[8] He remarks that the fascia lata is a genuine girth, resistant, thick (2 to 3 mm.), tense in the cadaver as in the living, which vibrates under the finger, no matter how little the femur is brought inward. He proposes calling it *the iliotibial girth.*

The trochanter is not held by the girth except in extension or in slight flexion, not over 20°. Beyond this the trochanter emerges from the posterior edge. In a cadaver with much muscular development this

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(7) Jour. de méd. de Bordeaux, Jan. 25, 1920.
(8) Presse méd., Dec. 27, 1919.

emergence is accompanied by a slight snap. During life, in normal conditions this snap is almost insensible, or rather non-existent. Why is it then that at will it becomes loud and sudden in certain individuals?

It has been said that it is due to a whole series of abnormal conditions—hyperostosis of trochanter, thickening of the posterior border of the band, absence of the serous sac (10 per cent.) inequalities of the inner surface of the band, post-inflammatory retraction of the aponeurosis. As a matter of fact there has been no precise observation of any of these causes. Possibly the posterior edge may be unusually thick in muscular subjects, in fact most cases of snapping hip have been encountered in such individuals.

Until some such abnormal condition can be proved, the muscular theory suffices to explain the cases usually seen. There are three factors, necessary for success of the maneuver. First maximum tension of the band on the trochanter by energetic contraction of the gluteus maximus. Next the subject brings the point of the foot inward (internal rotation), *i. e.*, he orients the axis of the femoral neck decidedly perpendicular to the band, which the trochanter then lifts to the maximum. In other words the "artist" renders the cord tense which he vibrates, and raises the bridge which supports it, and we see that the snap must be sudden, as soon as slight flexion permits it.

There must be something else, adds Mariau, otherwise the whole community could acquire this trick, which can be done by only a few "artists," though of exceptional muscular development, it is true. The third factor he believes is of muscular origin, as well, and must be combined with the other two to produce the maximum effect: This consists in relaxing the gluteus medius and minimus, in inhibiting the obstructive action on the trochanter. Under this hypothesis the "artist" acquires the power to dissociate the synergistic action of the glutei, just as others can use the orbital muscles in squinting, or dislocate the metacarpo-phlangeal joint by action of the thenar muscles. No doubt this happens accidentally the first time, then it becomes voluntary, consciously or unconsciously. From this time the field is open to the obsessions of neuropaths, and the comedy only ends when the surgeon is called to operate.

Considerable surprise has been manifested as to why transverse section of the girth at the level of the trochanter instantly puts a stop to the snap; the reason is, according to Mariau, that it severs the violin string, of which the trochanter is at once both bridge and plectrum. This intervention should be as economical as possible, confined to the posterior border, otherwise when walking the subject deprived of so important a physiologic apparatus as the iliotibial girth, may become fatigued unusually early.

[Some operators in this country have sutured the posterior border of the tensor fasciae femoris to the edge of the trochanter. This prevents the snapping, and does not weaken the structure. Several cases were seen in Army service, and in one instance the soldier was evidently attempting to convince the examiners that he had a recurrent dislocation of the hip-joint. He had successfully deceived several medical men, but when the actual condition was recognized and explained he readily admitted that he had for many years realized the harmlessness of the slipping, and stated that it was purely voluntary. He was very willing to accept a discharge "without disability." Some years ago a young man who had been in a street-car accident attempted to secure a damage-settlement from the car company by claiming to have a recurrent hip-dislocation as the result of injury. The condition of "snapping hip" was not at all well known at that period, but Dr. M. L. Harris, of Chicago, made the diagnosis without difficulty, and the patient finally admitted that the condition had long antedated the injury.

The Editor has never observed a snapping hip in a person of the female sex, nor does he recall any feminine cases in the literature. It must be stated, in fairness to many of the patients, that some of them, at least, are entirely unable to control the phenomenon, in spite of earnest effort. These people, obviously, are legitimate operative material.

F. Wood Jones (*Journal of Orthopedic Surgery,* January, 1920) has a different explanation of the pathology. He operated in two typical cases and found that under anesthesia it was impossible by manipulation to reproduce the snapping of the hip. When, however, the gluteus maximus was caused to contract by means of electrical stimulation, and the hip manipulation during contraction, the snapping was elicited every time the great trochanter was rotated backward or forward. Upon dividing the fascial insertion of the muscle and retracting it, it was at once apparent that the structure which caused the snap was the tendon developed on the deep surface of the gluteus maximus. This tendon constitutes the insertion of the muscle to the gluteal ridge, and it was seen that in these two cases the tendon was in an abnormal state of development. The patients were cured by stitching the tendon down to the whole length of the trochanter.—Ed.]

Fracture of the Neck of the Femur in the Feeble. W. D. Wise[9] believes in putting the patient in a Gatch bed, in a modified Fowler position, with adhesive plaster extension in the line of the flexed thigh, leaving the flexed leg free, with the extremity abducted as much as the bed will allow or the patient will permit. "Place a 'doughnut' pad under the heel, and raise or lower the back-rest as desired."

The advantages are:

It can be applied immediately, thus preventing shortening.

The patient sits in a comfortable position and is troubled by no uncomfortable apparatus. There is free access to the skin, and bedsores can be prevented.

There is continuous even traction in any position.

The immobilization is not complete enough to cause atrophy from disuse. Muscular power and joint-motion are retained.

It is easy to get the patient on and off the bed-pan.

The treatment can be instituted with little assistance, and in private homes.

The sitting position guards against hypostatic congestion of the lungs, and pneumonia.

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(9) Surg. Gynec. and Obstet., August, 1919.

Fracture of the Femur. This article by J. P. Jones[1] citing 271 cases treated by means of ice-tong calipers with average of 0.5 cm. of shortening, deals with the use of ice-tong calipers in combination with the Thomas splint for fractures of the femur.

The tongs are applied under aseptic conditions through one-inch incision, inner side, about one-half inch on proximal side of adductor tubercle. The outer side incision is at the most prominent portion of the external condyle anterior to the tibial band. A screw bar on tongs is fastened to prevent separation of points or further penetration. The points are not to enter the cancellous portion of the bone. Correct fit of the Thomas splint against the tuber-ischii is important, also the use of weight and pulley to this ring, preventing patient from being drawn down in bed by traction on the tongs. A weight of 15 lbs. is ample in most cases. A half-ring Thomas splint may be used in wounds of the buttock. The line of the Thomas splint should be with the line of deformity. The other leg need not be immobilized. Pain generally lasts for only a few days. Sepsis is more feared than actually occurs. The tongs are contraindicated in knee-joint infections or inflammations. Frequent *x*-ray examination is advised.

Management of Fractured Femurs: Team work of medical officer, orderly, nurse, masseuse is essential. The medical officer must note alignment, pulleys and signs of infection. Masseuse: massage of leg; motion of ankle and toes. Nurse: use of fracture bed to aid in care and dressings.

Calipers are removed when union is firm. The leg should be kept in splint after removal of calipers and height of lower end increased to obtain flexion of the knee. Patient should walk with a walking Thomas splint for about sixty days. Bony union occurs in about nine weeks.

Foot-piece for the Thomas Splint. G. W. Maxson[2] adds a foot-piece to the ordinary Thomas splint in order to effect complete fixation and absolute immobilization without adhesive plaster and to procure ready adjust-

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(1) Jour. Orthop. Surg., January, 1920.
(2) Surg. Gynec. and Obstet., July, 1920.

ment, quick application and portability. A foot-board 12″x4″ and a heel rest 8″x4″ are joined by angle irons, forming an appliance which can be supported on the side rods of the Thomas splint by a notched metal cross-arm 10″ long. The use of this apparatus has proven worth while in the war zone and it is particularly recommended in industrial plants, mines and railway service.

Ambulatory Treatment of Fracture of Neck of Femur. This article is presented by Edward H. Bradford.[3] An old woman was treated by the use of Bradford's abduction traction splint applied three days after injury. In three months there was complete restoration and no shortening.

[This very ingenious splint has never received the recognition that it deserves. It is most efficient in the treatment of hip-joint tuberculosis, and is valuable in fractures of the upper end of the femur. It was described by Bradford in the *American Journal of Orthopedic Surgery,* February, 1913, and is, in effect, a Thomas knee splint with a posterior half-ring, the inner border of this ring being prolonged forward and arched above the mons veneris, then bent downward around the opposite pubis and terminating in a quarter-ring fitting against the corresponding ischial tuberosity. The entire ring-assembly is padded and covered with basil leather. The uprights terminate in a walking foot-piece. with a slotted windlass and ratchet to which are attached the webbing straps of the adhesive plaster extension (Plate I).

This splint will effectually prevent the ordinary adduction occurring in tuberculosis of the hip, and can be so adjusted as to furnish almost any degree of abduction which may be desired. The traction produces sufficient fixation of the joint to insure reasonable immobilization in subacute cases.—Ed.]

Lengthening of the Quadriceps Tendon. In a very suggestive paper G. E. Bennett[4] calls attention to the frequency with which loss of flexion of the knee-joint follows trauma or inflammatory lesions of the femur,

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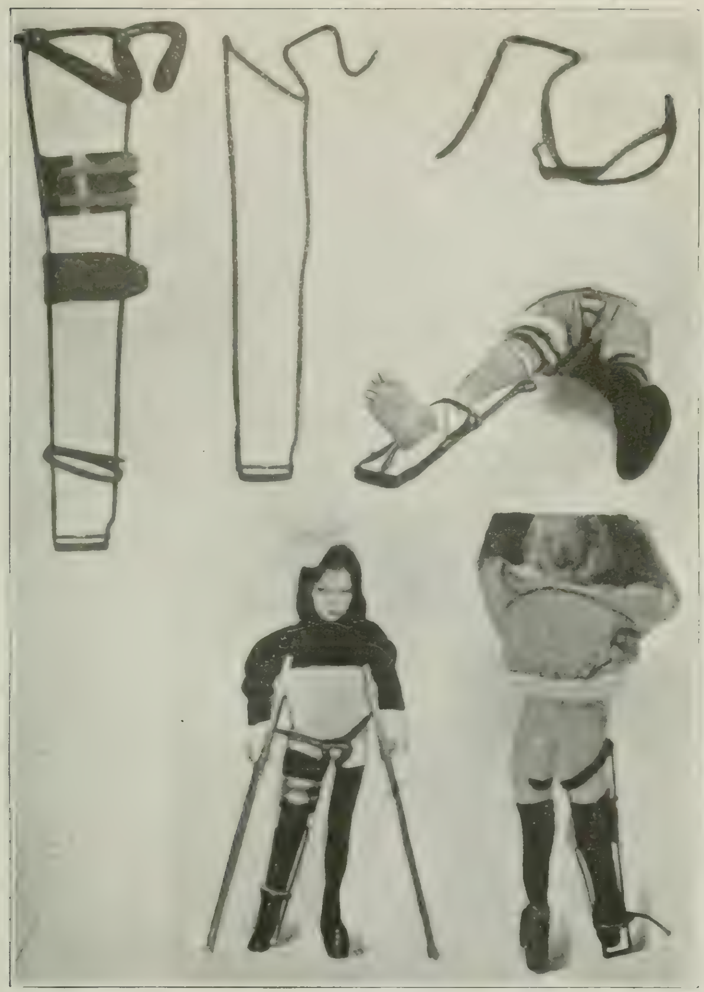
(3) Jour. Orthop. Surg., August, 1919.
(4) Ibid., September, 1919.



Abduction and traction appliance giving also protection from jar in locomotion and adequate fixation of the hip-joint in the subacute stage. —Bradford, page 208.

when there has been no damage to the joint itself. Believing that the muscles forming the tendon of the quadriceps femoris were the structures at fault in this type of case, he has lengthened these muscles by operation with excellent results. In some cases the muscles were adherent to the shaft of the femur, and in others the tendon and muscles were shortened by long immobilization in apparatus with the knee extended. The operation most generally used was a V-shaped dissection of the tendon, with the base downward, at the upper border of the patella. The tendon is freed upward four or five inches, and the knee forcibly flexed. This makes a tongue-shaped peninsula of tendon extending upward from the patella, with the vasti gaping widely above and at the sides. The vasti are now sewed to the tendon strongly, with the knee still in 80 degrees of flexion, and the entire limb is fixed in a plaster splint for three weeks. Passive motion in extension is then made, and no voluntary use is made of the quadriceps for at least another week.

[This operation may be found very useful in a limited type of cases. It was performed by the Editor in the summer of 1915, in a case of bilateral forward congenital dislocation of the knees, in a little boy who also had congenitally dislocated hips. The knees were first operated on, and sewed up in flexion, and the hips were then reduced. This work was done in a mining camp in southern Arizona, when the operator was on his way to the meeting of the American Medical Association in San Francisco. The result was very fair. Two other similar operations were done upon the knees of soldiers at General Hospital No. 28, the limitation of motion being due to adhesions of the muscles to the femur after compound gunshot fractures. The results were not brilliant, and might have been better if a piece of fat and fascia or of prepared membrane (Baer's or Allison's) had been interposed between the muscles and the bone.—Ed.]

Resection of Tibia with Grafting. L. E. Barrington-Ward[5] strongly advocates a more radical treatment of osteomyelitis by the entire removal of the shaft of the

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(5) Lancet, May 15, 1920.

diseased bone and the proper splinting of the limb for a sufficient time for the reproduction of a diaphysis in healthy bone. The author cuts a transplant usually from the tibia of the exact length required. It is fastened and fixed as an internal splint, making it unnecessary to use external apparatus, except temporarily. He contends that the presence of fresh healthy bone cells of the graft assist in dealing with any joint infection which is so apt to be left behind when the older method of removal of diseased bone by curettement is followed.

Anomalies in Ossification of Patella Mistaken for Fracture. In three cases under observation by L. Moreau[6] either there was no history of trauma, or the clinical examination was negative and the radiogram of the opposite side showed the same condition:

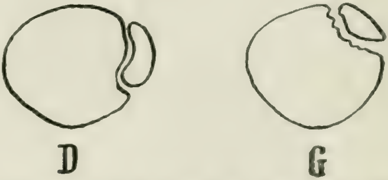

Fig. 12. Tracing of radiogram, showing on the right patella (D) the accessory bony nucleus on inner border; on left side (G) this nucleus occupies the supero-external angle.

Case I. Man, aged 40, suffering with left knee for many years: There was no history of trauma. There were articular crackling and limitation of flexion, and the *x*-ray clearly showed the lesions of arthritis deformans, together with an independent nucleus of ossification at the supero-external angle of the bone (*patella bipartita*).

Case II. Soldier complaining of pain in left knee: There were scars of actual cautery, but neither effusion nor thickening of either synovial cul-de-sac. Bone was not tender on palpation. The man claimed that a carriage had run over the middle of the leg (?) some three years before. Radiography showed independence of the supero-external angle of bone, which was smaller than the rest and separated by a rather wide space.

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(6) Presse méd., June 9, 1920.

Case III. Young sailor, who had fallen 23 feet into the hold of a ship: Right knee was painful, with swelling on the inner side of the tibial tuberosity; here there was the only painful point. Clinically nothing could be detected in the patella. The *x*-ray showed an independent bony nodule applied to the inner side of the patella, which was curved in to receive it. The outer border of the nodule was sinuous—S-shaped; the patellar border had the same shape but reversed. There was another accessory nodule on left side, this, however, occupied the supero-external angle as usual. The surface in contact with the patella was less regular than on the right side, the patellar surface being decidedly irregular and dentate as if it had been torn loose. If the trauma had involved this side it would readily have been mistaken for a fracture.

Moreau points out that in certain old fractures of the patella, even examination with the *x*-ray may not clear up the case owing to these anomalies of ossification which should not be forgotten. If the *patella bipartita* be overlooked, serious errors may occur in estimating injuries to workmen. The differential diagnosis, it must be admitted, is by no means easy. In old fractures there is neither pain, nor gap on palpation. In case of anomalies, the print may show, in place of a clear line, irregular margins, with apparent callus here and there. These accessory nuclei of ossification are located at the supero-external angle, and a print from the opposite side will show the same arrangement. Nevertheless this anomaly may be present on but one side, as is sometimes the case with certain sesamoids or supernumerary bones.

Hitherto Undescribed Dislocation of the Patella Endwise. J. W. Perkins[7] reports this case.

The patient, a boy of 16, struck his right knee a severe blow, just above the patella. He was unable to flex or extend his leg and had considerable pain immediately.

At once there was considerable effusion into the joint. The patella was dislocated, projecting directly toward the front of the joint, apparently endwise. The Roentgen ray showed the dislocated patella, of which the

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(7) Jour. Amer. Med. Ass'n., Feb. 7, 1920.

upper end was down between the condyles; the lower end projected forward. The long axis was at right angles to the normal.

The leg was held slightly flexed and rigid. Attempts at further flexion were very painful. Under ether the patella could be replaced in normal position with the leg flexed, but when the leg was extended the patella again dislocated.

The following day the joint was opened by a longitudinal incision outside the patella. About eight ounces of old blood were removed from the joint. The tendon of the quadriceps extensor was torn loose from the patella, and the patella was found endwise between the condyles, with the upper end directed backward toward the popliteal space. It was dislodged and brought upward into its normal position, where it remained. No attempt was made to repair the quadriceps extensor tendon. Recovery was uneventful. One month after the accident the knee could be flexed to a right angle and extended to within five degrees of a straight line.

Elongation of Tendo Achillis by Transverse Flaps. Describing this method, which he does not claim as new, but which gives good results, R. Toupet[8] writes that the usual method of uniting the ends is not satisfactory, the surface of contact is minimal, and owing to the fibrillary nature of the tendon the sutures dissociate the parallel bundles on the least movement. Poncet's accordeon-plan is not much better. More logical appears Delbet's plan of dividing the outer half of tendon at the upper part and the inner half at the lower, then by forced flexion sliding the half-tendons against each other, thus apposing two surfaces which though narrow are long, and the tendon sheath is respected (Fig. 13).

The plan which Toupet prefers is to divide the tendon transversely into two large flaps, joined by U-shaped sutures and affording a large surface in contact, which speedily unites. To perform it correctly it is necessary to know the structure of the tendon: The lower portion is homogeneous, purely tendinous, while its upper half has a very special structure. On section transversely we see that the fibers of the soleus lose themselves on the inner side of the deep surface, hence

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(8) Presse méd., Feb. 21, 1920.

if the tendon be divided in two equal parts according to thickness, only the superficial posterior flap will be entirely tendinous. The anterior deep one is tendinous in its outer half, muscular in the inner half (Figs. 14 and 15).

To obtain two flaps tendinous throughout instead of cutting them of uniform thickness, the section is oblique, thick at base, thin at ends, this enables surfaces of the same structure to be joined. The knife punctures the tendon at its insertion into the os calcis, cuts up closer to the deep surface, always keeping parallel to the tendinous bundles; on reaching upper end of tendon, the knife emerges at a right angle. The superficial flap is then turned down and the deep one is ready by merely loosening the tendon where it is attached to the bone. The wide surfaces are sutured with catgut, one U-shaped

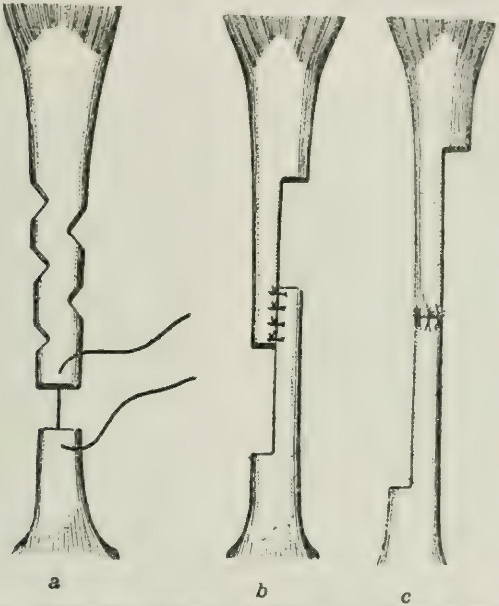

Fig. 13. Elongation of Tendo Achillis. (a) Poncet's method; (b) Faure's method, Delbat uses no sutures; (c) Usual method.

at each angle, and four other U-sutures inserted in between (Figs. 16 and 17).

The limb is immobilized in a light plaster cast for eight days. On the eighth day, the sutures and cast are removed, and the patient is allowed to put foot to floor. Walking is permitted in two or three days more with aid of two canes, care being taken that the man walks correctly and without limping. Surveillance of the patient must commence now, guarding especially against the unfortunate tendency to relapse.

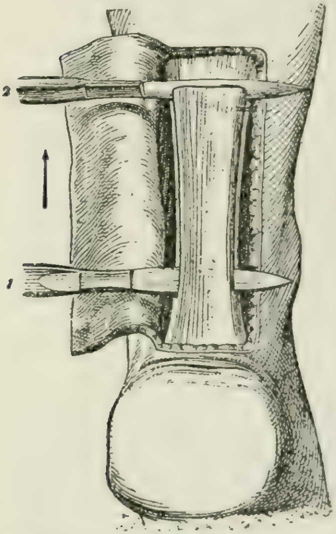

Fig. 14. Cutting superficial flap.

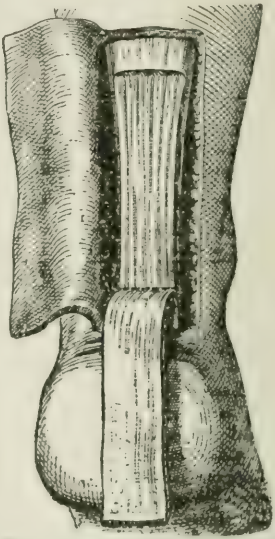

Fig. 15. Superficial flap ready. The deep one is to be mobilized following the dotted line.

Troublesome Foot. Painful foot is the term which should be used for the troublesome foot, says Charles Parker,[9] instead of the universal term of "flat foot" or "fallen arch."

The foot has the same structures as the hand and is subject to the same pathologic processes.

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(9) Railway Surg. Jour., August, 1919.

The skin may have callosities due to pressure. The tendons and their sheaths are predisposed to their peculiar affections due to their special responsibilities. The vascular and nervous systems are also affected here with their usual manifestations plus local influences. The task is to interpret and treat these various processes by regional study of the foot, as heel, ball, the subastragaloid joint or an inflamed tendon sheath.

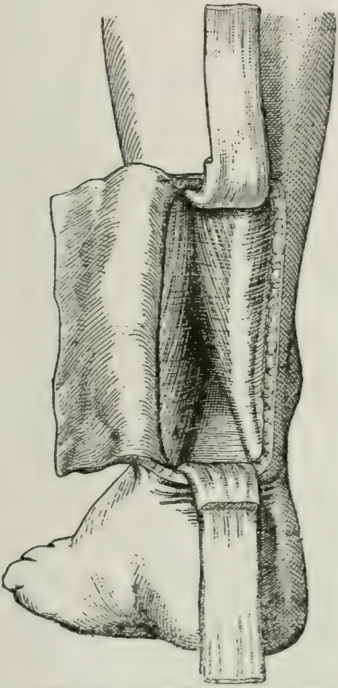

Fig. 16. The two flaps separated.

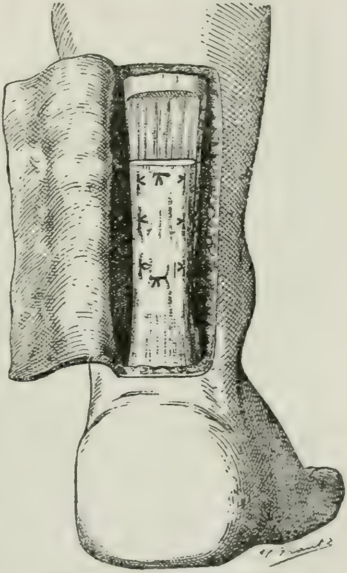

Fig. 17. Flaps sutured.

Heel. Painful heels, which are usually thought to accompany Neisserian infections are probably more often due to other types of local infections.

The sites of pain are 1½ inches in front of posterior border at the attachment of plantar muscles and fascia

—a region of constant strain in walking—or anywhere on the non-articular surfaces—a favorite place being at the attachment of the tendo Achilles. These spurs are the result of an inflammatory process. Their operative removal is not the panacea today that it originally appeared to be. Their physical presence is not the cause of pain but rather the inflammatory process during their development is the painful affair and the one requiring attention.

Subastragaloid Joint. This is the largest joint of the foot proper, in which all the lateral and twisting movements of the foot take place. Patients with pathology in this joint may walk on smooth even surfaces without complaint because of the up and downward motion of the ankle-joint proper, but on uneven surfaces where there is twisting of the subastragaloid joint there is much complaint. Arthrodesis of this joint is indicated in certain conditions, as constant pain and uncontrollable pronation.

Ball of Foot. Women are the most frequent sufferers from disturbance in this region as a result of improper footwear, especially the short shoes which are high heeled with the toboggan slide effect, bending the toes back and throwing an abnormal weight on the ball.

Treatment of the Average Case of Weak Feet. G. N. Morrill[1] argues that individuals suffering from weak or flat feet should receive instructions so that they may understand the structure of the feet, the common causes of the condition to be treated, the comparison with normal structures and the proper shoes which should be worn. He would first encourage the patient to insist on receiving advice from a qualified surgeon instead of from other individuals. It is his opinion that instructions thus sought and heeded will pave the way for present-day treatment by a scientifically qualified surgeon instead of by shoe-clerks and so-called "foot specialists." It is his experience that far more permanent results are secured by other methods than by rigid and semi-rigid metal arches.

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(1) Ohio State Med. Jour., June, 1920.

Fracture of the Posterior Tubercle of the Astragalus vs. Inconstant Os Trigonum. F. W. O'Brien[2] brings up for discussion the question of whether the line of separation, shown in radiograms in some cases of injury to the astragalus, just behind the external malleolus, is a line of fracture of the "processus posticus tali" (the external tubercle of the astragalus), or the line separating the inconstant epiphyseal "os trigonum" from the astragalus.

He reviews the literature, and records a case showing radiograms of non-union of a piece of bone in this region, in which the patient complained of pain and swelling due to injury. Later, the non-union disappeared, and pain subsided under treatment in plaster. He concludes by saying: "If the os trigonum is only loosely attached or in some cases fused with the astragalus, it follows that it might very well be pulled off by strain on the posterior bundle of the external lateral ligament of the ankle-joint. If fused with the astragalus, it could be separated by the same force as fracture of the posterior tubercle, *viz.,* a fall upon the heel with the foot in plantar flexion. It seems fair to conclude that the roentgenologists should make a closer study of the region in the presence of clinical signs."

Stripping of the Os Calcis. The operative procedure of subperiosteal stripping of muscular attachments to the anterior surface of the os calcis is of value, says A. Steindler,[3] only in claw foot and hollow foot, in which the deformity is due to contracted muscles, no skeletal deformity being present.

Technique: This consists of a curved incision from the posterior aspect of the heel in front of the inner side of the foot, reaching to a point 1½ in. in front of the tubercle of the os calcis. The plantar fascia is then dissected free and incised across at its insertion to the lower surface of the os calcis. All structures attached to the lower surface of the os calcis are stripped off by means of a sharp periosteal elevator, the stripping to include the ligamentum plantare longum, which is attached to the os calcis at its junction with the cuboid. Plantar

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(2) Boston Med. and Surg. Jour., May 27, 1920.
(3) Jour. Orthop. Surg., January, 1920.

vessels and nerves are avoided by keeping to the inner tuberosity of the os calcis.

Steindler's series comprised fifty cases, as follows: Infantile, thirty-six; spastic, five; traumatic paralysis, four; congenital clawfoot, four; congenital clubfoot, two.

Tenoplasty. Tenoplasty of the tendo-Achillis is to be avoided as it is a mechanical factor in correcting cavus deformity. Osteotomy or manual correction should be combined with stripping in cases of skeletal changes.

Spontaneous Cure of Metatarsus Varus. A. Rendu[4] reports a case with radiograms of a child, who when 18 months old had metatarsus varus on the left side. At the age of ten years, the x-ray showed the malformation had spontaneously disappeared. No similar case seems to be recorded.

Calcaneo Cavus and Its Treatment. N. Dunn[5] mentions shortening of the tendo Achillis and plication of the posterior portion of the capsule of the ankle joint; Davis's operation with displacement of the foot backwards and transplant when necessary of the peroneal and posterior Tibial tendons; Whitman's operation in which astragalectomy is done, and the objections to these operations are cited.

He offers, as a substitute, an operation which preserves flexion and extension of the foot with stability. Dunn states that our consideration of these points can only be effective if we also recognize the relative importance of the various movements of the foot. The human foot is adapted mainly for support and locomotion, and for these it depends largely on its muscular control. The most important movements in propulsion of the body are controlled flexion and extension of the foot at the ankle. We must therefore endeavor to retain these, sacrificing elasticity if necessary. We can assure stability by substituting bony for ligamentous union between the mediotarsal and subastragaloid joints.

For actual muscular control of extension of the ankle we must depend, as a rule, on transplanted muscles, but we can make their action more effective if necessary by

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(4) Presse méd., Feb. 21, 1920.
(5) Jour. Orthop. Surg., December, 1919.

displacing the foot backward and so increasing their leverage.

The operation in detail is as follows: The plantar fascia is divided with a tenotome, and the cavus deformity corrected as much as possible by manipulation or moderate wrenching. Through a four-inch incision over the outer part of the dorsum of the foot between the tendons of the extensor longus digitorum and the peroneus tertius, a clear subperiosteal exposure of the mid tarsus is obtained. A bony wedge is then removed, base upward, which allows correction of the cavus deformity. This will involve the greater part of the scaphoid and the calcaneo-cuboid joint.

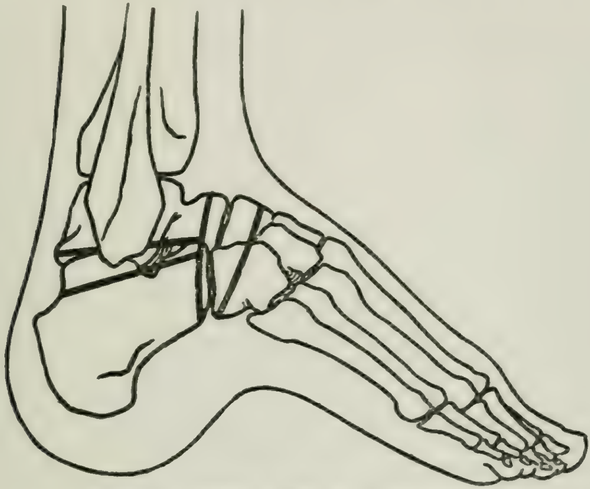

Fig. 18. Showing wedge of bone removed.

The child is next turned on its face and a long incision made over the posterior surface of the ankle.

The tendo Achillis is retracted and all the remaining tendons of the posterior tibial and peroneal groups exposed and divided as far forward as possible.

A wedge of bone, base backward, is next removed from the astragalus and os calcis. The wedge should include the subastragaloid joint and extend forward to the mid-tarsal resection. It should be cut so as to allow easy correction of the calcaneus, as well as any associated valgus or varus deformities (Fig. 18).

The tendo Achillis is next split into an anterior and posterior layer in its lower two inches. A hole is bored in the posterior extremity of the os calcis and the tendons of the flexor longus digitorum, tibialis posticus, and flexor longus hallucis are nested on the one side and the peroneus tendons, longus and brevis on the other. These are incorporated on each side of the tendo Achillis, drawn well down into the channel and the ligatures tied over a roll of gauze on the heel. The transplanted tendons are thus fixed in their bed, while further sutures are introduced to fix them to the tendo Achillis. The result in these cases in regard to function is excellent and has, in Dunn's experience withstood the test of time.

In the event of muscle recovery the ankle joint is thus left intact.

Surgical Treatment of Hallux Valgus. At a meeting of the Surgical Society of Lyons, L. Tavernier[6] showed a patient who had had a marked case of bilateral hallux valgus, the toe forming a right angle with the metatarsal. Both sides were operated on at the same sitting, but by different methods: On one side there was simple resection of the head of the metatarsal. For the other side he performed Juvara's operation, *i. e.,* cuneiform osteotomy of the diaphysis of the first metatarsal, in order to bring out the distal end of the bone, this deviation to the inner side being considered as the cause of the outward displacement. After five months had elapsed the results were equally good on either side. However, looking more closely it was found that while the side operated on by Juvara's method was less esthetic, there being an appreciable swelling of the metatarsal diaphysis, the functional result was better, the joint preserving all its motions, while the one after resection was occasionally somewhat painful after walking.

On the other hand, these resections are much more simple, while osteotomy and osteosynthesis are laborious and even really difficult. In any event it is interesting

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(6) Presse méd., Dec. 27, 1919.

to notice that Juvara's method, which at first seems paradoxical, corrects the deformity so well, and seems to justify thoroughly the theory on which it is founded.

Congenital Equinovarus. C. F. Eikenbary[7] reports 114 cases in which sixty of the patients had had previous operations or manipulations. He optimistically declares that the surgical problems in connection with treatment are not at all difficult and that there is no mystery surrounding the correction of club-foot. He feels that with proper treatment, the exercise of patience with long-standing stubborn cases, the performance of secondary operations where relapses are seen and cuneiform resections where required, good walking feet will result in most cases. He says that failures are largely due to three reasons:

The operator fails to grasp the fact that he is dealing with a triple deformity, equinus, varus and adduction of the forward part of the foot.

The deformity is not *over*-corrected and frequently not even corrected.

The retentive apparatus is taken off too soon.

He pleads for early attention as soon after birth as possible. Babies a week to ten days old may have full correction by the end of a month with the use of plaster, but must be retained in a plaster support usually for a year. In children over six months old, it is usually necessary to do an extensive manipulation to overcome the well-established varus and adduction. The Achilles tendon usually must be divided, but the division of any structure on the inner side of the foot is never necessary. In severe cases in children over 6 years of age, cuneiform resection gives satisfactory results. After treatment is complete in any of these types, the writer emphasizes the necessity of walking so that the weight may be borne in the correct position as a part of the cure. He insists on walking in the casts at the earliest possible moment and without casts if sufficient time has elapsed after correction.

The Loop Operation for Paralytic Equinovalgus; with Remarks on the Principles of Operative Treatment of Paralytic Deformities of the Foot. This valu-

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(7) Surg. Gynec. and Obstet., June, 1920.

able paper by R. Whitman[8] is made up of two parts. The first is a description of an operation for the relief of paralytic equinovalgus, which Whitman says is the most common paralytic distortion of the foot. The operation is designed to reduce the abducting forces by the removal of the peroneus brevis and tertius; to increase the power of dorsal flexion by transplanting the peroneus brevis and extensor longus hallucis to the inner (not outer) border of the foot; to lessen the tendency to deformity by displacing the dorsal tendons from the outer to the inner side of the foot, where they are retained by looping about them the tendon of the tibialis anticus and implanting it in the tibia to serve as a supplementary support for the inner border of the foot. The inward displacement of the dorsal tendons and the means employed to assure it are the original features of the operation.

Technique of Operation: All restriction to adduction and dorsal flexion is first overcome. This usually requires division of the tendo Achillis. An incision is then made behind the external malleolus, extending upward over the lower third of the fibula. The peroneal sheath is opened and the tendon of the brevis is freed from its attachments about the malleolus. Its insertion at the base of the fifth metatarsal is cut through a small incision and the tendon is drawn back, the muscular fibers being separated from the fibula up to the point of transference. A long incision is then made over the center of the ankle, extending from about three inches above the joint downward to the metatarsal region. The tendon of the peroneus tertius is cut at its insertion and separated from the adjoining tendons of the common extensors. These latter tendons are carefully dissected from the underlying tissues, and the annular ligament is cut so that they may be displaced to the inner border of the foot without tension. The tendon of the peroneus brevis is passed through the sheath of the tibialis anticus according to the Biesalski-Mayer technique, and sewed to the attachment of the tibialis anticus and to the periosteum. The longus hallucis tendon is cut at the same plane, drawn through an opening in

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(8) Jour. Orthop. Surg., August, 1919.

its sheath, and, together with the tendon of the peroneus tertius, is attached to the periosteum of the scaphoid. The tendon of the tibialis anticus is then passed from within outward under all the dorsal tendons, and is drawn upward and embedded in a groove running in a direction upward and inward, cut in the inner border of the tibia after the Gallie method, at a sufficient tension to hold the foot at a right angle to the leg and slightly inverted. The incisions are sutured in two layers, and a plaster splint is applied fixing the foot in the position above described. The patient is encouraged to use the foot in walking as soon as weight-bearing causes no discomfort. The splint is continued for three months, in hospital practice, but may be replaced by a removable support much earlier than this if careful supervision may be assured. The most important indication in the after-treatment is to insure the free range of dorsal flexion by methodical stretching and exercises.

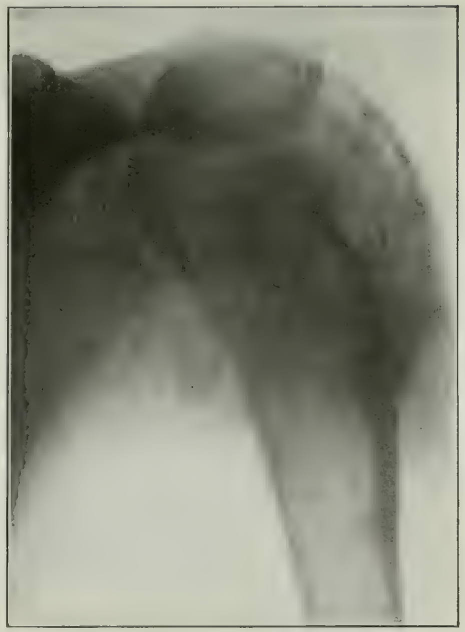
[This operation is ingenious and not too complicated, and can fairly be criticized in only one detail: the method of attaching the tendon of the extensor proprius hallucis to the periosteum of the scaphoid. In the opinion of the Editor, the attachment of a tendon to the periosteum is undesirable, first, because the periosteum is so thin and delicate that a firm attachment is impossible, and, second, that under the constant pull of an active tendon the periosteal shreds embraced by the sutures are pulled out into a long thin cord which materially reduces the normal degree of tension necessary for good function. This latter fact has been demonstrated in several cases at subsequent operation in the Editor's clinics. In addition to these objections it may be stated that the scaphoid is not mechanically so good a site for the attachment as is the internal cuneiform or the first metatarsal bone, since it is desirable to pull the forefoot around from its valgus position into slight varus. It is very easy to drill a hole in the base of the metatarsal and to pass the tendon or half of the tendon through the hole and sew it back upon itself with the certainty of a strong attachment, and it obviates the need of pulling the tendon out of its sheath.

Another point upon which there might be a difference of opinion is the utilization of the tibialis anticus tendon after the method of Gallie to hold the foot up at a right angle and also to act as a retention loop to hold the active tendons toward the medial side of the foot. Here we have room for argument. If the transferred tendons (peroneus brevis and tertius, and the proprius hallucis) are going to be strong enough to dorsiflex the foot, there will be no need of converting the tibialis anticus into a suspending ligament. It will, in fact, be distinctly undesirable, since it will prevent plantar flexion if it performs its expected function. The experience of most operators, however, shows that the Gallie technique rarely succeeds in preventing plantar flexion, although it is extremely valuable in restraining lateral deviations of the foot. When the tibialis anticus is fastened to the tibia by this method, there is usually observed an immediate success and a later failure, the foot gradually resuming its former equinus position. This seems to be due to the stretching of the tendon rather than to a loosening of the attachment to the bone. If the tendon, then, becomes lax enough to allow the foot to drop, it would also allow the extensor tendons to resume their former position and function to a degree perhaps undesirable. A modification of the method at once suggests itself, by which the tendon of the tibialis anticus might be looped at a more acute angle around the extensor tendons and fastened to the median surface of the scaphoid.

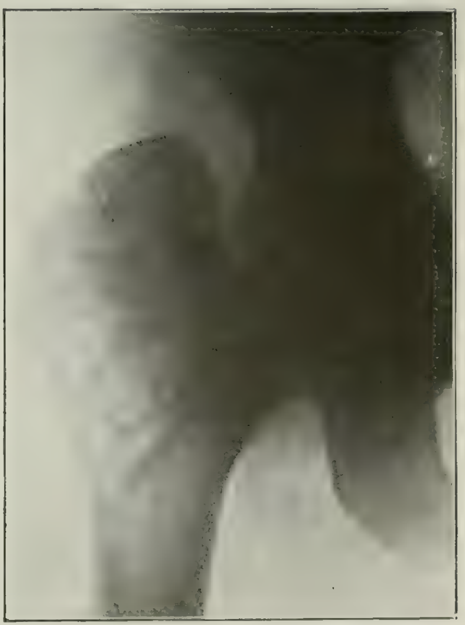
It is also the opinion of the Editor, that all tendon transplantations designed to relieve or to prevent lateral distortions of paralytic feet should be supplemented by arthrodesis of the astragalo-scaphoid, sub-astragaloid and calcaneo-cuboid joints.

It may be stated as a postulate that a paralytic foot, which can by no artifice be restored to the absolute norm, will be more useful in pure flexion and extension than in any other combinations of movements, and that all efforts must be directed primarily toward the attainment of properly balanced power in the plantar and dorsal flexors. The arthrodesis operations are unquestionably easier to perform successfully in older children and

PLATE II.



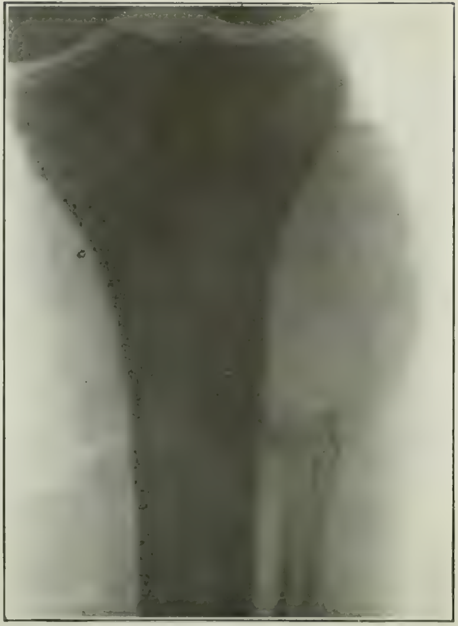
Central myxo-sarcoma. Greater tuberosity of humerous.



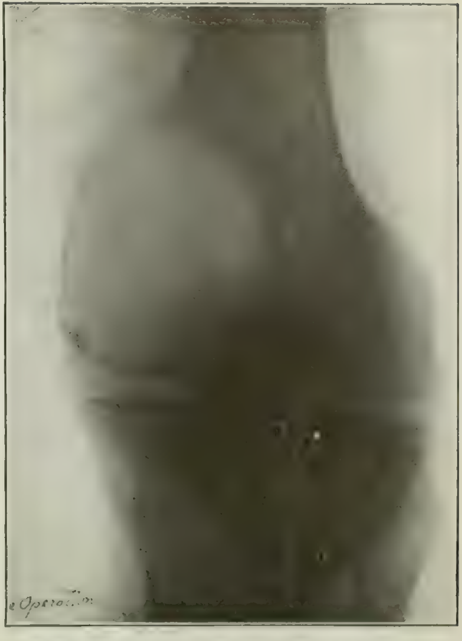
Benign bone cyst trochanter femur.

Bloodgood, page 226.

PLATE III.



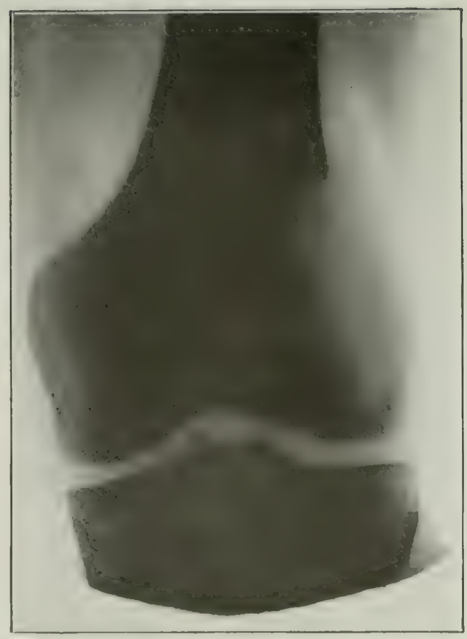
Central giant cell tumor. Upper end of fibula.



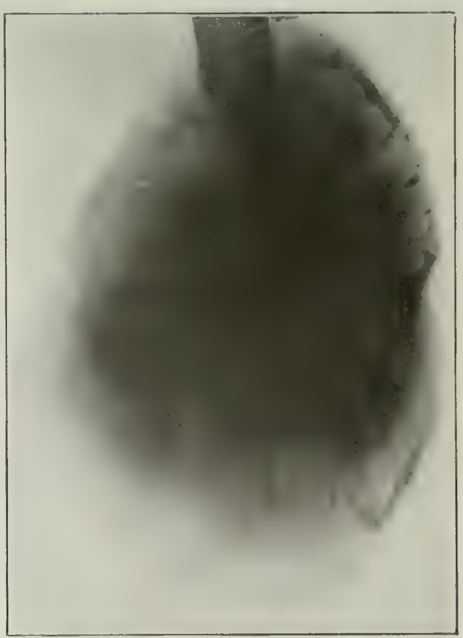
Central giant cell tumor, inner condyle femur.

Bloodgood, page 226.

PLATE IV.



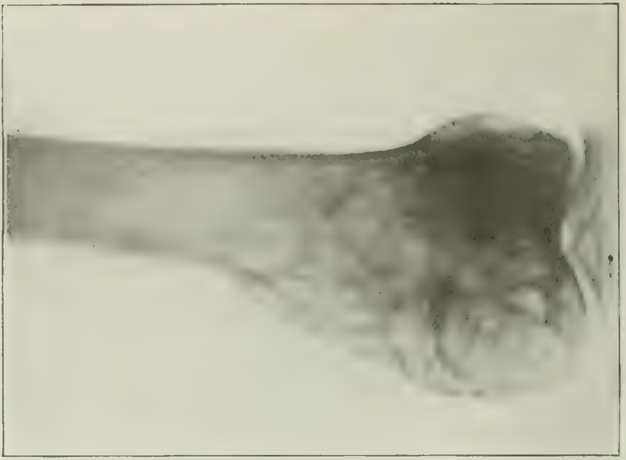
Malignant central bone cyst. Outer condyle femur.



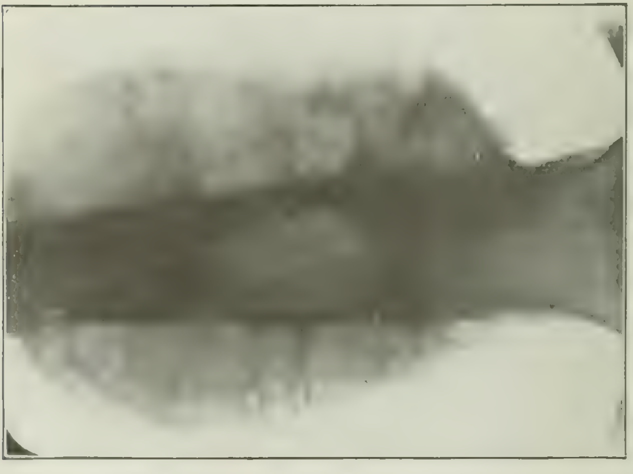
Benign bone cyst. Lower end of femur. (Huge size.)

Bloodgood, page 226.

PLATE V.



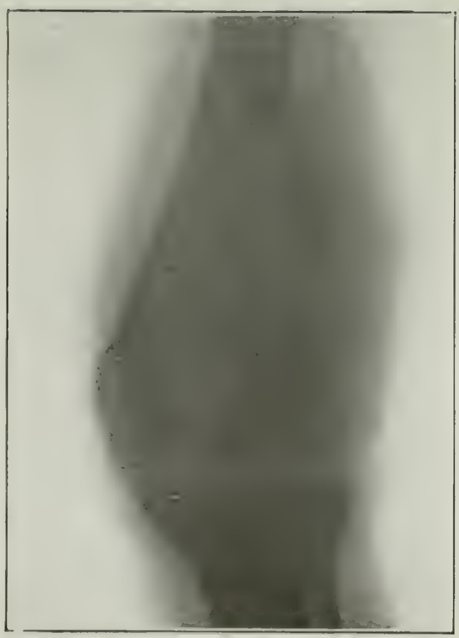
Central chondroma. Lower end of femur.



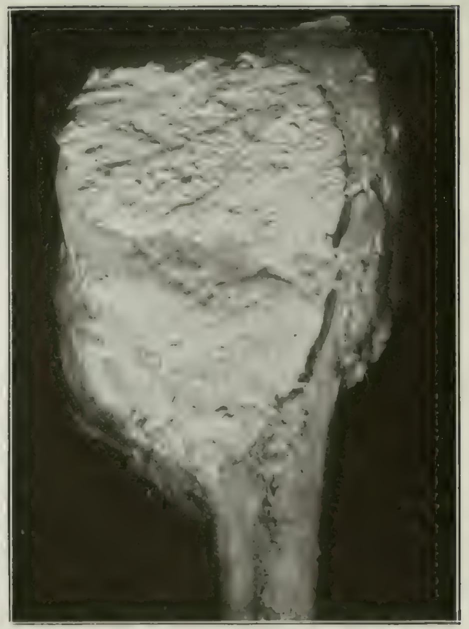
Benign bone cyst. Shaft of femur (huge).

Bloodgood, page 226.

PLATE VI.



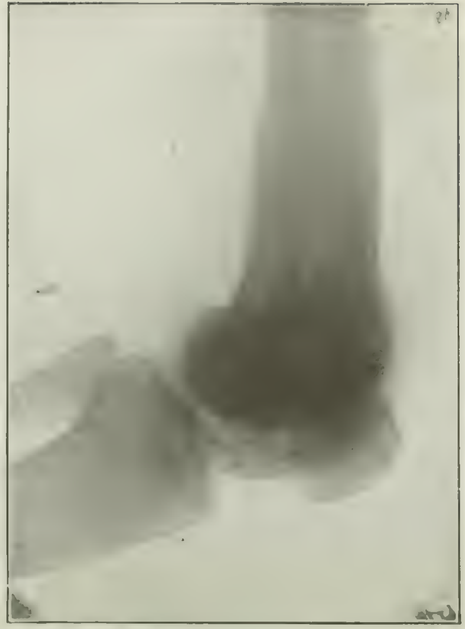
Central fibro-sarcoma. Lower end of femur.



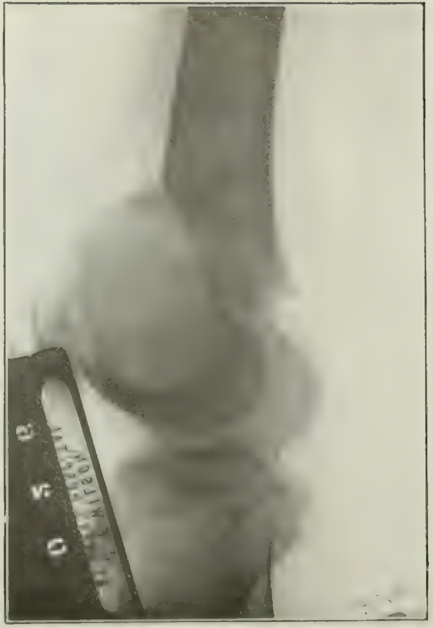
Central fibro-sarcoma. Lower end of femur. For x-ray see figure on left.

Bloodgood, page 226.

PLATE VII.



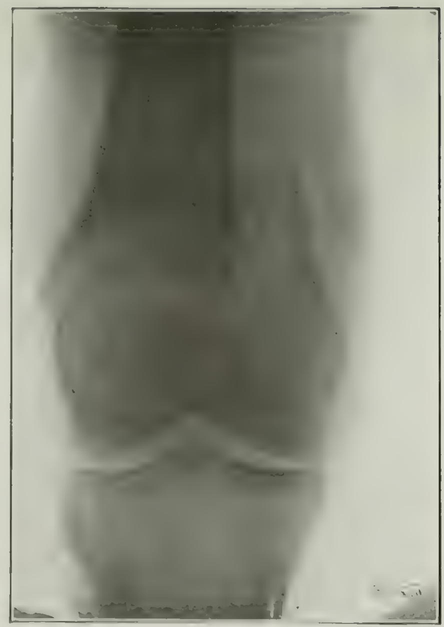
Malignant central bone cyst. Lower end of femur.



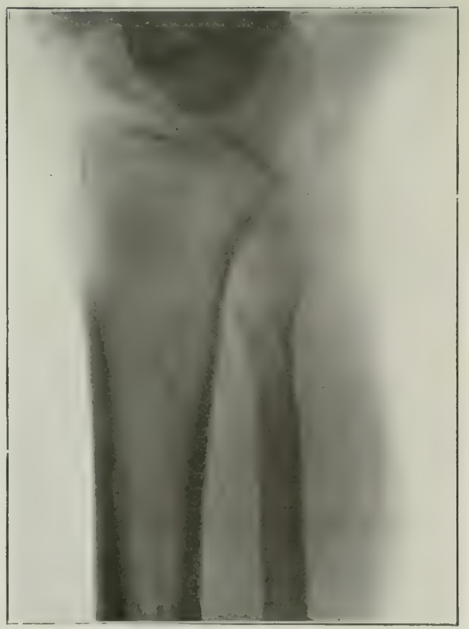
Central malignant bone cyst. Lower end of femur.

Bloodgood, page 226.

PLATE VIII.



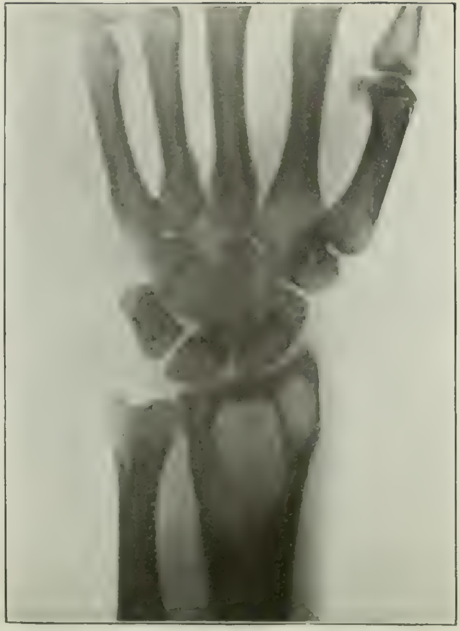
Central malignant bone cyst. Lower end of femur.



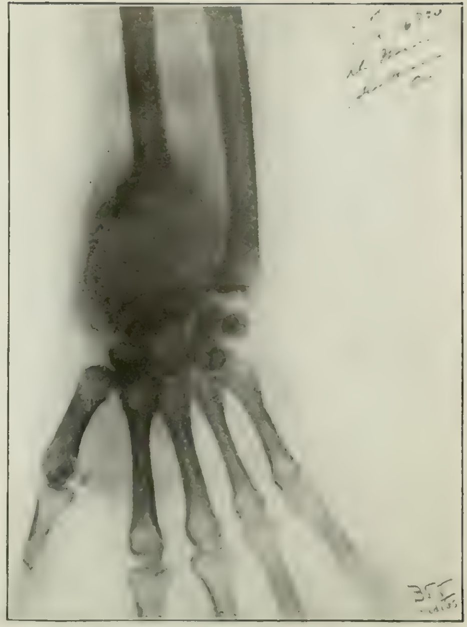
Metastatic myxoma tubercle of tibia after amputation of leg for recurrent myxoma in ankle joint.

Bloodgood, page 226.

PLATE IX.



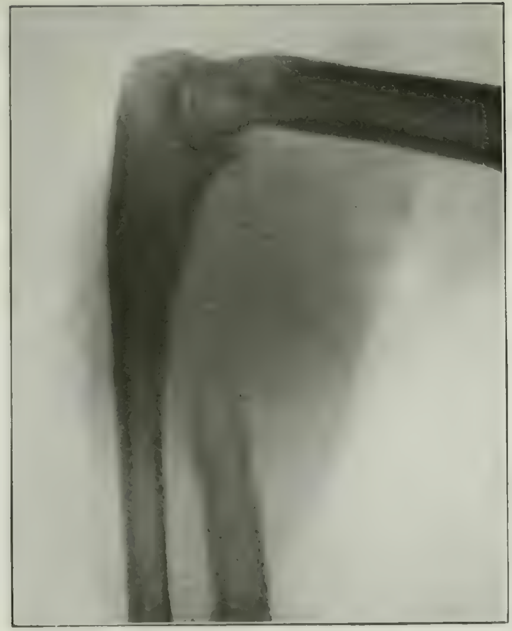
Central benign bone cyst. Lower end of radius.



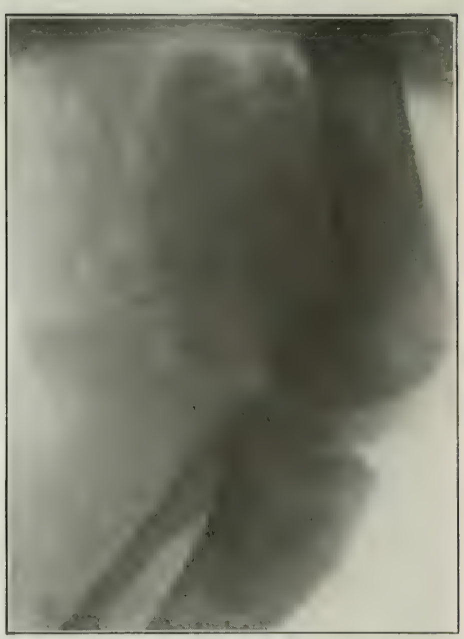
Giant-cell tumor of lower end of radius. Marked expansion of bony shell. Patient of Dr. Sherman of San Francisco.

Bloodgood, page 226.

PLATE X.



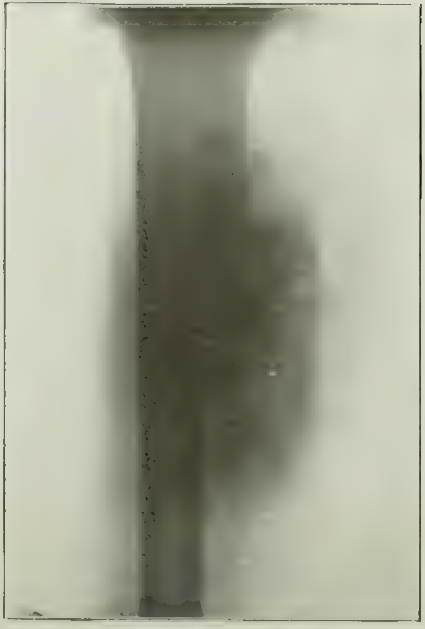
Central sarcoma of upper end of radius. Complete destruction of bone. The tumor shows a shadow.



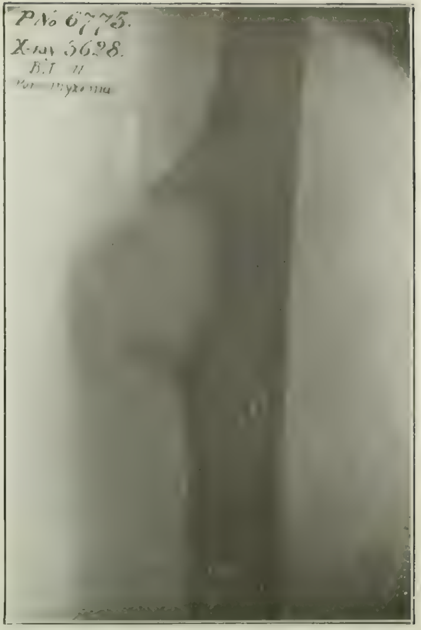
Diagnosed benign exostosis of femur. Removed piecemeal. Myxoma found mixed with cancellous bone. Local recurrence and death.

Bloodgood, page 226.

PLATE XI.

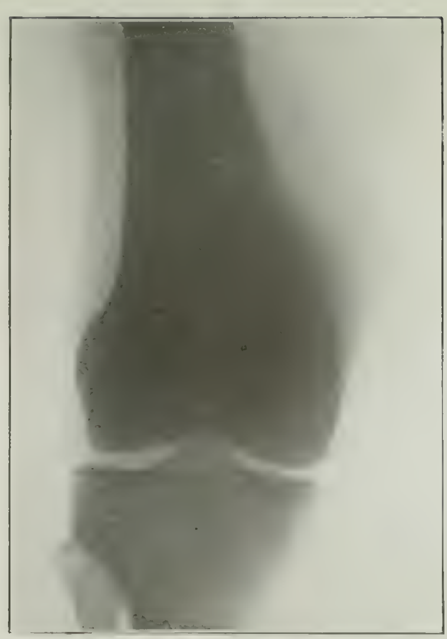


Periosteal osteochondroma of shaft of femur.

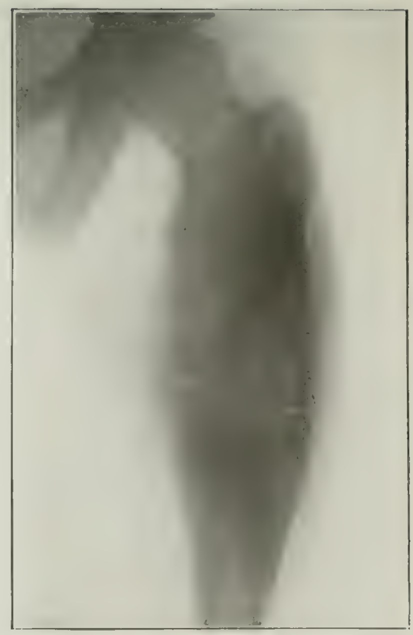


Periosteal myxoma of shaft of humerus.

PLATE XII.



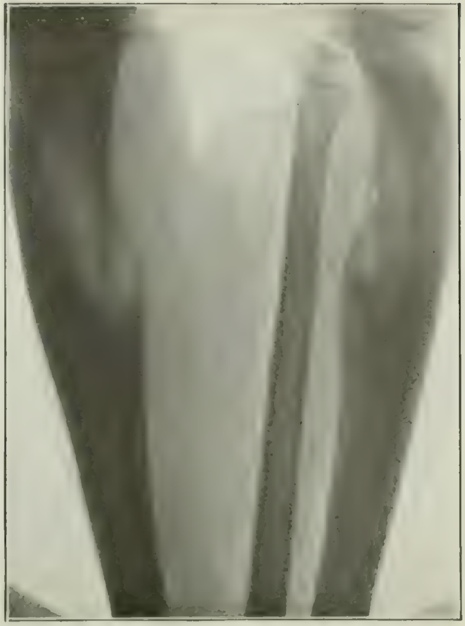
Periosteal sarcoma of lower end of femur.



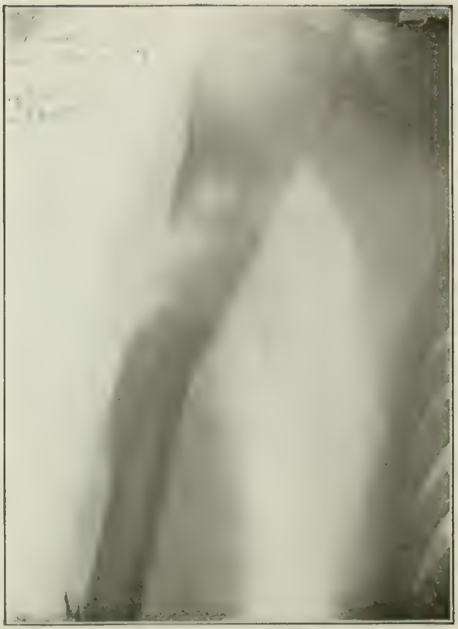
Periosteal sarcoma of upper end of femur, resembling osteomyelitis.

Bloodgood, page 226.

PLATE XIII.



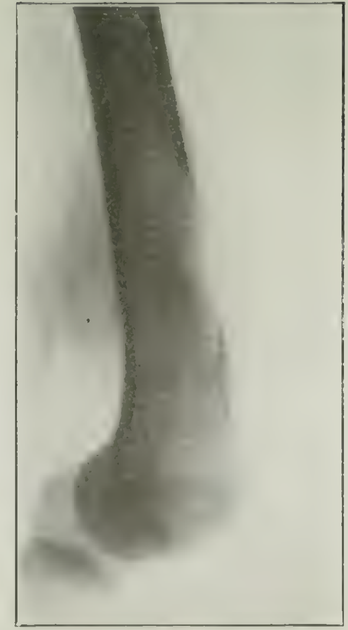
Periosteal sarcoma of upper end of tibia. Diagnosed osteomyelitis.



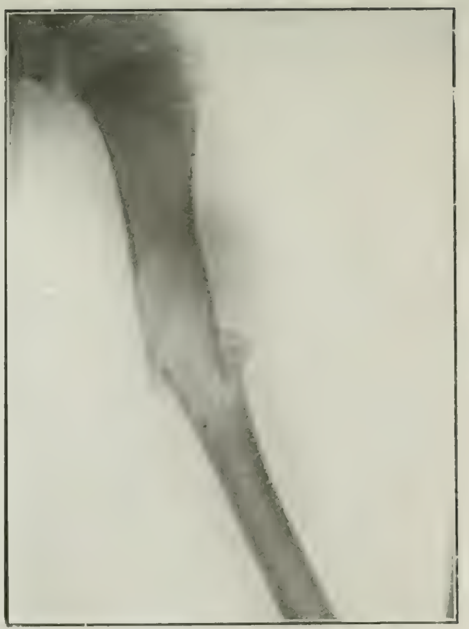
Periosteal sarcoma of shaft of humerus. Practically no periosteal bone formation, only destruction of shaft.

Bloodgood, page 226.

PLATE XIV.



Periosteal sarcoma of lower end of femur with much bone destruction and early metastasis to lung.



Benign central solid ostitis fibrosa, shaft of humerus, pathologic fracture.

Bloodgood, page 226.

adults, but by using the method described by Gwilym G. Davis, it is possible to fuse the tarsal bones in even small children. This operation is done through a small incision on each side of the foot below the malleoli. A small curette is inserted, and the articular surfaces are roughly gouged and cut, leaving all the bony and cartilaginous detritus in situ. The result is a complete fusion of the astragalus, calcaneus and scaphoid, which obliterates more or less completely the tendency to lateral deviation of the posterior half of the foot. It may be said that this operation adds very little to the time or the risk of the remaining procedures, and adds a great deal to the function of foot.—Ed.]

Treatment of Congenital Club-Foot. Miller[9] outlines the following technique:

1. Subcutaneous tenotomy of the tendo Achillis.
2. V-shaped incision on inner side of foot over astragalo-scaphoid articulation with apex of incision pointing well down toward great toe.
3. Divide scaphoid into anterior and posterior halves.
4. Transplant wedge of bone from tibia between fragments of scaphoid.
5. Apply plaster-of-Paris cast in over-corrected position.

The advantages of this operation are that the foot is longer and has a more natural appearance than by other operative measures.

[This operation is that described by Albee in his textbook on "Orthopedic Surgery." A word of warning should be given to those who attempt it. The bone wedge implanted into the split scaphoid is by far the *least* important feature of the operation. The foot must be thoroughly over-corrected by the stretching and division of the soft tissues, ligaments and tendons before the wedge is implanted. In infants and very young children, this operation would not be necessary. In older children it might be a valuable adjunct, and it might shorten the time of treatment by producing a skeletal obstacle to relapse.—Ed.]

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(9) Amer. Jour. Surgery.

BONE SURGERY.

Diagnosis and Treatment of Tumors of Bone. J. C. Bloodgood[1] contributes a very important study of 240 cases of benign and malignant bone-tumors. The probability of a permanent cure, even after high amputation, for the true periosteal and central sarcoma of bone is so small that, when one is confronted with a bone lesion, one should not perform any radical operation until every possible means of diagnosis has been employed. The burden of proof is to demonstrate that the lesion is malignant. In periosteal sarcoma there are but two cures in the seventy cases followed. The average duration of life is one year or less. The cause of death is metastasis to the lung, and not local recurrence. The central sarcoma shows a little better prognosis, and the duration of life is longer.

The most characteristic feature of the *x*-ray of a bone cyst, a central giant-cell tumor, or a central sarcoma, is the absence of new bone formation in the periosteum covering the expanded and thin shell present in some cases.

Myxoma should be classed with and treated as sarcoma. The danger in myxoma is the exploration of the tumor, because myxoma tissue is more transplantable on the same individual than any other form of normal or tumor tissue.

When the *x*-ray shows a central or marrow lesion, the probabilities are that it is benign, 107 cases to 31. Occasionally, tuberculosis may produce a tumor resembling a central benign or malignant tumor. The most common central tumor in a phalanx is a myxoma.

In all bone tumors except the bone cyst, the predominating symptom of onset is localized pain, and such pain in a bone or joint should be looked upon as a more emphatic indication for an immediate *x*-ray examination than a fracture.

Pathologic fracture is more apt to occur in bone cysts than in malignant disease, 50 per cent. to 10.

In removing tumor tissue for examination it is most important to prevent dissemination into the exposed

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(1) Jour. Radiol., March, 1920.

normal tissues. The technique of the destruction of the tumor tissue exposed is the immediate application of pure phenol followed by alcohol, and the temporary packing of the wound with a piece of gauze saturated with a 50 per cent. solution of chloride of zinc, or, in suitable cases, the use of the electric cautery. If possible, the operation for removal should follow immediately after the diagnosis from the gross appearance and the frozen section.

[This article is so important that it should be read in the original by all who are called upon to diagnosticate and treat bone and joint lesions. The *x*-ray reproductions are of great value. There are eighty-nine pictures, with descriptive captions and text (Plates II to XIV).]

Chondromas. Chondromas usually occur at sites of pre-existing cartilage, the epiphyseal line, and so forth, and involve the epiphysis and diaphysis. There is a greater tendency, says H. W. Meyerding,[2] to growth into the epiphysis, where, at times, it apparently remains until late in the history of the growth. The periosteum is not involved and appears normal by *x*-ray and at operation. The cortex may appear normal by *x*-ray and at operation unless it is thinned by pressure or bulges out, or unless it is involved with the medullary substance, when it appears as a homogeneous tumor.

Chondromas do not invade the soft peri-osseous tissues as is so frequently seen in malignant tumors. Trauma appears to be an etiologic factor, especially in the growths on the hands. Although these tumors occur most frequently in the young, they may occur late in life. and should be taken into consideration when other factors indicate benign tumor formation. Superimposed bursae may become injured, and a rapid swelling or a rapid growth may follow which is suggestive of malignant change or degeneration.

The contents of the tumor usually consist of pure hyaline cartilage in which a fine supporting framework of connective tissue is found, or it may be crossed by a bony network and trabeculations. The latter produce definite coarse lines in the *x*-ray picture which ramify

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(2) Jour. Orthop. Surg., February, 1920.

in an irregular manner across the more transparent areas.

The history of the case, the clinical examination and the *x*-ray findings may present such a complex picture that it will be necessary to resort to surgery and pathologic examination in order to arrive at a correct diagnosis. Even benign chondromas may recur, and such recurrences should be carefully watched for malignant change. None of the cases in this series showed subsequent malignancy. It should be remembered that degenerating processes may cause cysts, probably due to pressure-degeneration and poor vascular supply. The *x*-ray is of great value in determining the size, location, and difference between the single and multiple varieties of chondromas, but it should not be depended on in making a definite diagnosis. There was a fairly similar picture between the giant-cell tumor and the chondroma in some of the author's cases. Surgical intervention in cases of chondroma should be conservative. The prognosis is favorable.

Chronic Septic Inflammation in Bone Following Gunshot Wound. This important article by W. E. Gallie[3] will well repay reading in the original. It is much too long to be abstracted, and the conclusions only will be given here. It is the result of an unusually large experience in both practical and experimental work. He presents the following conclusions:

The periosteum is the medium by which the blood-vessels are distributed to the shafts of the bones. Reflection of this membrane produces superficial necrosis and should never be done when sepsis is present or feared.

The periosteum as reflected in an ordinary surgical operation is merely a fibrous tissue membrane and is not osteogenetic. It should, therefore, never be relied upon to restore the shaft after resection.

Mild septic inflammation is a strong stimulant of inflammatory osteogenesis. It causes widespread osteoporosis, increased vascularity, and abundant callus-formation. This is the state in which cavities are most apt to heal, and fractures to unite, unless prevented by

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(3) Jour. Orthop. Surg., August, 1919.

some definite condition such as the presence of sequestra or the existence of too large a gap.

When the irritation subsides or disappears, this rarefying osteitis gives place to an intense sclerosis which is very inimical to the healing of cavities or the union of fractures.

Treatment, therefore, should take advantage of the pathologic condition which is present at the time the sequestra have separated, and aim at a complete cure before osteosclerosis has supervened. It should consist of the complete excision of the scar and sinus, and the wide removal of the walls of the cavity for the purpose of thorough evacuation of sequestra and unhealthy granulation tissue. All irregularities and pockets must be obliterated, and when possible the depth of the cavity should be reduced by allowing the soft structures to fall into it. Pedunculated muscle or fascia-flaps are of great assistance in promoting rapid healing. Finally, wide-open drainage must be provided so that the cavity can heal from the bottom without depending on the dangerous alternative of a narrow sinus.

Taylor's apparatus (water-tight closure around wound by means of a rubber tank, with 10 per cent. salt solution applied under one foot pressure-head, two hours positive pressure and fifteen minutes negative pressure) is useful in cleansing these wounds before operation, and is of great value in the treatment of postoperative sepsis.

Non-union in compound fractures, uncomplicated by great loss of bone, is rare. When present, the fact that the wound is septic is no contraindication to active treatment of the fracture as well as of the osteomyelitis. Gratifying results may be anticipated from thorough freshening of the ends and adjusting of the fragments, providing efficient drainage is secured.

The best time to correct malunion in septic cases is at the time of the operation for the cure of the disease in the bone.

[For many years the treatment of osteomyelitis has been almost at a stand-still. The principles enunciated by Gallie are applicable in the chronic cases seen in civilian life as well as in the cases due to military casualties. Hematogenous osteomyelitis and the bone infections due to septic compound fractures should be treated along the lines indicated above. Other methods, such as the chemical sterilization of the infected area, the use of various kinds of pastes and fillings, and the different modifications of the Carrel-Dakin technique, have had their ups and downs. It is important to maintain one's mental balance in considering the claims made by the advocates of the various methods.

The first requisite is undoubtedly a skilfully performed operation, radical, and yet not too radical. The second requisite is absolutely wide-open drainage, with the use of a cleansing and mildly antiseptic irrigation. In the experience of many men, this can best be done by the Carrel-Dakin technique, exactly followed. Taylor's use of strong salt-solution with the water-tight closure tank is not very well known by many of us, including the Editor, but has been extremely satisfactory at the Dominion Orthopaedic Hospital in Toronto. The third requisite is the recognition of the fact that time is a very important factor in the cure of osteomyelitis. It is probable that if operation be done before the bone has become sclerosed, almost any reasonable technique will bring success; while, if too long delayed, the bone cells will have lost their powers of repair.

The use of muscle-flaps should be more widely practiced where large bone cavities have been produced. They are more viable than skin-flaps, and cause less cosmetic deformity.—Ed.]

The Use of Autogenous Bone Grafts in the Treatment of Certain Simple Fractures of Bone. There are today, says Basil Hughes,[4] very few fractures of bone in which a satisfactory length and alignment can not be obtained without resorting to open operation.

The popular war splints have overcome much of the difficulty in maintaining length and alignment.

The risk of compression and constriction, delayed union and ischemic paralysis and similar conditions are also overcome.

There are still, however, a few simple fractures difficult to treat satisfactorily without open operations.

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(4) Lancet, March 13, 1920.

These include fractures situated in the immediate neighborhood of the hip and shoulder joints, which are often followed by osteo-arthritic changes unless a very accurate reduction is obtained, and spiral fracture of the lower third of the tibia, where imperfect length and alignment will lead to faulty transmission of body weight, accompanied by its attendant evils.

Bone Grafts: Their Fate and Advantages over Plates and Screws: In order that a bone graft may grow and function, certain conditions are essential.

1. The graft must be autogenous. Bone transplanted from the lower animals to man, or from one individual to another, lives and functions only very exceptionally.
2. The graft must be suitably nourished. A piece of bone transplanted from one part of the body to another will continue to live if strict asepsis has been observed.
3. When removing the graft, it is advisable to include both periosteum and endosteum.
4. When once the graft has commenced to unite a certain amount of movement of the muscles can be allowed with advantage.

There are several theories to explain what actually happens to the bone graft.

The important question seems to be: Is the graft osteogenetic or is it not? Some hold that all the bone is formed entirely from the periosteum.

Macewan's view that the new bone is formed by proliferation of osteoblast within the bone itself, and is independent of the periosteum, directly contradicts the above.

Another view is that the graft is not in any way osteogenetic, but simply acts as a scaffolding which in due course is absorbed and replaced by new bone by immigration into it, first of osteoclasts and later of osteoblasts from the adjacent bone.

Hughes believes that all these views are in part correct, if the periosteum be taken to include the true cambium of the bone. In using a bone graft we are not dealing with a foreign body, but with living tissue which in time becomes part of the bone and in which the line of stress and strain eventually conform according to Wolff's law.

The type of graft called for in the case of simple fractures in almost invariably the sliding graft.

The usual technique for bone operation should be strictly observed.

The graft has usually grown firmly by the end of the sixth week, and at the end of the eighth week the patient may begin to use the limb.

Skiagrams taken after the tenth week show the graft to be almost indistinguishable both in texture and quality from the adjacent bone.

Report of Patient Six Years After the Implantation of a Homoplastic Bone Graft. This report is made by Henry Wade.[5]

The patient was admitted to the hospital in August, 1913. One week before admission he slipped and fell upon his shoulder. This caused a feeling of numbness in the arm. Any attempt at movement caused severe pain. The *x*-ray showed the presence of a myeloid sarcoma of the upper end of the shaft of the humerus which had thinned the bone and produced a spontaneous fracture, involving the articular surface of the head of the humerus and communicating with the joint. A fracture of the same humerus two years before had healed satisfactorily.

Operation showed a central myeloid sarcoma. The head and upper portion of the shaft were removed, six inches of bone being taken away. An inch and a half cuff of periosteum was left attached to the lower portion of bone.

The previous case, a man of 67, had a thigh amputation of the lower third for senile gangrene. This lower end of femur with its articular surface was dissected out and divided vertically into four parts, one of which was implanted to make good the gap in the humerus. The portion of the articular cartilage of the femur on the graft was laid in contact with the glenoid cavity, and the lower end fitted in the periosteal cuff attached to the remaining portion of the humerus. The muscles and skin were closed over the graft. No attempt was made at fastening it otherwise.

Convalescence was uneventful and the man left the

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(5) Edinburgh Med. Jour., January, 1920.

hospital less than a month after admission. Two months after operation he resumed his work in a mill and has continued since. When examined in November, 1919, the new bone was firmly united to the shaft of the humerus. Motion in the joint was free in all directions and painless.

[This remarkable case is of great interest, since there are very few reports in the literature of cases followed and examined so long after a homoplastic bone-graft. It is unfortunate that it is so difficult to find the material for such grafts at the time when they are needed, but reports such as this should stimulate us to further effort. —Ed.]

Bone Grafting in Treatment of Fractures. In commenting upon the likelihood that bone grafting is apt to fall into discredit, owing to the failures resulting from improper technique, E. W. H. Groves[6] argues that, with due regard to vital and mechanical principles, bone grafting gives results which are better than can be obtained by any other method. A careful study of the behavior of living autogenous grafts is essential. Since the most carefully prepared graft can not be expected actively to correct a deformity, it is important that any deformity shall be fully corrected before the graft is inserted. It is necessary that the graft shall be firmly fixed. It is quite possible for a living graft to survive under septic conditions. Groves calls attention to the proper preparation of the bed into which the graft is laid, laying special emphasis on possible failure due to presence of any latent sepsis in scar tissue and atrophy and sclerosis of the bone ends. He comments in a very interesting manner upon his use of the "cricket-bail" graft, the "thrust-split" graft and the "two-piece" graft.

A New Method of Bone Transplantation. Any method of transplantation of tissue must be founded, says Barney Brooks,[7] on a thorough knowledge of the manner of growth and regeneration of the tissue transplanted.

The site and amount of bone regeneration which took

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(6) Lancet, May 15, 1920.
(7) South West Jour., Med. and Surg., March, 1920.

place in any given length of time was observed by a process of staining the growing bone. A dye, alizarin red, was given repeatedly to experimental animals. This dye colors all growing bone a bright red. Bone not in a state of active regeneration during the administration of the dye is not colored.

It was found that transplants with the periosteal and endosteal surfaces removed did not produce bone, nor did the implants of dead bone stimulate new bone growth from the surrounding tissues. It was also observed that not all bone transplants with the periosteal and endosteal surfaces intact regenerated new bone. This was especially true if the animal were advanced in age.

A transplant taken from growing bone is much more likely to be successful than one taken from a bone which is not growing.

Another series of experiments was carried out in which an attempt was made to stimulate a bone to regeneration prior to the time of removal of the transplant from the bone. Old animals were used. The bone was traumatised by two incisions in the shaft with a twin saw. The animal was allowed to recover. On the tenth day after operation the animal was again anesthetized and the wound reopened. The section of bone between the parallel saw-cuts was removed. This piece always showed a thickened periosteum and nodules of regenerating bone.

The transplant was placed in a defect in the right ulna. From the other thigh a plain transplant was removed and placed in a defect in the left ulna.

The animals were allowed to live varying periods of time. They were given repeated injections of alizarin red, in order to stain all new bone formed. The results of seventeen experiments are shown in the following tables:

Type of Bone Transp.	No. Experiments	Success		Failure	
		No.	%	No.	%
Growing bone.......	17	16	94.1	1	5.9
Plain bone..........	17	10	59	7	41

This is not a method to be used as a routine, but is useful in cases of non-united fractures in which non-union is due to poor osteogenesis.

Reports on Cinematic Amputations. This article is based on a visit to Putti's military clinic at Bologna, Italy, by J. A. Gunn and W. E. Gallie[8] and the officers state that they had an opportunity to see between 15 and 20 cases in all stages up to three months after operation upon which cinematicization had been done and expressed the opinion and preference for the tubulization method, over the club method. They stated as their reason for this opinion, that the operative technique and the formation of the pedunculated knob is more intricate than that of the tubulization and that the application of power in tubulized cases was more direct. They also cite instances of cases of amputation below the insertion of the pronator teres in which this function was used, providing the distal ends of the bone were free, to operate the fingers of an artificial hand. In any instance it is not understood that these operations will produce motor units which will stand the stress of great weight or hard labor. They are, however, applicable to all the ordinary duties of life which are more or less light in character, and add very materially to the ability of the patient.

Discussion on Cineplastic Amputations at the British Orthopedic Association. Opening Remarks by the President, Mr. E. Muirhead Little.[9] Cineplastic amputations were first conceived by Dr. Vanghetti in 1898, and until very recent years, have been discredited. During the past few years, however, a number of these operations have been performed, with the idea of obtaining motor units for the control of the essential movements in artificial limbs.

These various kinds of motors may roughly be divided into two classes, the club and the loop. In the former class are all those motors which are meant to be connected with the prosthesis by their peripheries, while the loop class includes all those which are connected by one or more central surfaces, such as the loop, the tunnel and the like. The club motor consists of one or more tendons or tendinous expansions, if possible together

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(8) Canadian Med. Ass'n. Jour., August, 1919.
(9) Jour. Orthop. Surg., April, 1920.

with a portion of its bony attachment, surrounded by a sleeve of sound skin. A ring is loosely clamped around the neck of this club to which the cord or other connection with the prosthesis is attached.

In the loop type, on the other hand, a rod or cord is passed through a skin-lined opening, in muscle or tendon; or else as in the case of the jug-handle form, a divided ring is clamped on to the skin covered tendon. Some of these jughandled motors consist of the tendons of the two muscles which are united together to form a loop, much as if two club motors without bone were joined together end to end.

Little stated that so far as his limited experience goes, the club form with osseous nodule in its end, gives the greatest promise of usefulness. The essentials in a plastic motor are the following: (1) Sufficient muscular power; (2) well-nourished and innervated skin covering; (3) ample range of movement; (4) size—sufficient length and thickness; (5) appropriate surface for counterpressure covered with well-nourished and resistant skin.

The range of motion in the upper extremity should be at least 1 inch, and 1½ or 2 inches are preferable; in those cases in which the range is small the effort is extended in an upward thrust of the prosthesis on to the stump.

The amputation sites suitable for cinematization are first, those so close to the joint that the segment below the articulation is of no use to work a socket. Second, stumps that are too long after amputation through joints as at the wrist, can well afford to lose an inch or two to make plastic motors. There is less room for it in the lower extremity than in the upper because of the simplicity of motions in the lower extremity. In the upper extremity it seems probable that it will be best to limit the number of motors to two, extensor and flexor.

Discussion by Mr. S. Alwyn Smith.

Mr. Smith's method of procedure in both the elbow types was as follows: He cut long anteroposterior flaps of over three inches; the flaps were turned up and the main vessels and nerves were tied off above that level; the lateral points of skin where anterior and posterior flaps met, had to be brought across to meet in the midline over the end of the bone. The bone was cut through at a suitable level so that the skin could be brought across without tension. He then covered over the end of the bone with the muscle and fat flap to prevent adhesion to the bone by the skin. Stitches were taken through the skin side by side at the highest lateral points of this incision and the skin coated over in the mid-line. This now caused each flap to become concave on its deep surface. The brachialis anticus and biceps tendons were scraped and the former wrapped around the latter and sutured to each other. The ends were turned over during the stitching, to make a hump at the end. He then stitched the joined tendons to the deep fascia of the flap and stitched the skin edges together to cover the tendons. The same thing was done on the triceps side. On the sixth day he wrapped sterile worsted fairly tightly around the outer end of each, making a constriction, and this was continued until it was substituted by the metal collar. At the end of six weeks the man could lift ten pounds with either peg without pain or discomfort by the collar, and the amount of flexor motion was 1½ inches and ¾ inch in the extensor motor.

The next case he cited was one of the forearm. He took the flexor carpi radialis and the flexor profundus digitorum on the one side and the two primary extensors of the wrist and the extensor communis on the other side.

Major Fitzmaurice-Kelly expressed his preference for the club method over the tunnel method for the reason that the latter has a great tendency to dermatitis, and he expressed the belief that the club motors have a tendency more to become hardened than tender, and therefore have a better chance of surviving for usefulness. He stated that it is rare to get more than 1 inch traction in a tunnel operation, whereas in the club method it is possible to get 2½ or 3 inches. Club motors are obviously the easiest to make. In outlining operative procedure as compared to that of Mr. Smith he advocated the use in addition thereto of the bony insertion of the muscles or the transplant of small parts of the bone into the ends of the motors to assist in the formation of the nodules. He cuts out half the thickness of the humerus in removing the insertion of the brachialis anticus and turns it up as an anterior club without disturbing the skin which is adherent to the anterior surface. The posterior triceps motor is made in a similar manner and the motors are clothed with skin.

The question was raised by Sir Robert Jones as to whether or not these particles of bone would eventually atrophy. He answers this question by stating that he has in hand cases which have been done in this manner which have more of a tendency to increase in size than to diminish. The technical difficulty in all the cases is keeping the neck of the motor and the greatest possible care has to be taken to fix the bone in its position long enough so that it will not escape and leave empty skin instead of a motor. Care is therefore exercised in preparing these motors, that the functionating element is firmly fixed within the stump of the club. He makes a mattress stitch through and through, fixing the bony element in the distal end of the unit so that it can not slip back. To protect it there it is tied by ¾-inch rubber tubing. He is rather of the opinion that a mixed prosthesis should be used rather than one of purely one type or the other, thus less multiplying the movements available. To overcome friction in which so much of the power is lost, he proposes to use a Bowden cable and to apply the power just above the point where wanted.

Mr. Rowley Bristow stated that in company with Major Dunn he visited an Italian clinic. He went to the clinic and saw the surgeon in charge and was told by him that he had done the operation seventy times and he said he had never seen a limb fitted, nor the subject to which one was fitted, using it.

At Bologna, Putti has 200 beds and 100 men working in the shops. It seems unlikely that any great progress will be made unless the two great factors concerned are immediately associated, that is the operating surgeon and the artificial limb manufacturer. The general opinion seems to be that the club motor is the one of preference, and that the manufacturers of artificial limbs have not reached the degree of perfection to meet the requirements of that which surgeons have produced.

A New and Efficient Method for the Use of Wire in Surgery of the Bones. J. M. Neff and J. G. O'Malia[9] advocate the retention by wiring of any number of conditions which may arise in the practice of bone surgery, but question its success in the shaft of the humerus, femur, tibia and both bones of the forearm where unusually strong support is needed. They adhere to Lane's technique after an enormous experience in military surgery in France. Over-lapping or parallel wires are soldered with an ordinary tinner's soldering iron in contrast to the extremely unmechanical procedure of wire twisting. Soldered terminals prevent loosening or breaking, preserve and maintain the original tension over any period of time and there is no irritation from twisted ends.

Exostoses After Nerve Wounds. Dejerine and Cellier, under the name of "para-osteo-arthritis of traumatic paraplegia," have described two kinds of lesions, one being intramuscular ossifications, which need no further notice. The other is "juxtaperiosteal, para-articular" close to the bone, and generally connected to it by small bridges or pegs. The epiphysis and diaphysis remain perfectly intact. These authors by reason of the accompanying neuritic symptoms in the territory of such exostoses, believe they are a special type of trophic disturbances.

M. Nathan[1] gives details of a case of this nature, in a young soldier who was shot in the calf and later developed exostoses over the heads of the first and fifth metatarsals respectively. The wound occurred April 1, 1917, and he came under observation for the exostoses July 25, 1919. Nathan believes the exostoses are set up by trophic lesions involving the limiting layer of the bone. Such lesions are not exceptional in nerve pathology, *e. g.*, after syringomyelia. In his patient, the lesions were not limited to the exostoses, the heads of the three other metatarsal bones were also ill-defined. Evidently, he adds, injury to the musculocutaneous nerve explains all the consequences.

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(9) Surg. Gynec. and Obstet., June, 1920.
(1) Annales de méd., February, 1920.

The Fundamentals of Bone Grafting for Pseudarthrosis. F. H. Albee[2] states that this condition is at present one of the greatest surgical problems. According to figures given him, he estimates there are in France alone, about 20,000 cases waiting for operation. The figures for the United States are not known as yet, but must be very high also. His remarks on the fundamentals are based on a large series of animal experiments, but more especially on about 2,000 cases in human beings.

Time for Operation. If possible a careful study must be made of the wound and the conditions under which healing took place—type of infecting organisms, nature of primary operation, manner in which cicatrization has occurred. The findings will serve as a guide to determine the time when one can operate with security.

Observation of Patient Immediately Before Operation. To ascertain whether or not there is any latent infection, in the week or two preceding operation, all splints, etc., are removed and the limb submitted to vigorous massage and manipulations. During this period the temperature is carefully noted, and close observation made if there is any local pain or signs of recurrent infection. The field of operation is prepared forty-eight hours in advance.

Plan of Operation and Choice of Incision. By clinical examination aided by the *x*-ray, the probable plan of operation and the point at which the graft is to be placed are carefully studied. When feasible, the skin incision should not be placed above the line where the bed for graft is to be hollowed out; the graft should be covered without undue tension on skin, and should be in contact with normal—and not with scar tissue. All manner of drainage is to be prohibited.

Duration of Operation. The time of intervention is to be as short as is compatible with good work; the trauma must be reduced to a minimum.

Use of Motor-Driven Instruments. This is indispensable for two reasons: (*a*) necessity of working rapidly to prevent drying and trauma of graft, as well as of

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(2) Presse méd., May 1, 1920.

the bony tissue for its reception; (*b*) to assure exact coaptation of parts.

Length of Graft. This should always, if possible, be of the "inlay" variety, and long enough to be embedded in each fragment for at least 2 inches, and always beyond the eburnated zone of these fragments. The gutter for receiving it must always extend into the medullary tissue of the receiving bone; it is important that a bridge of medulla be formed from the medullary tissue of one fragment to the same tissue in the other fragment to obtain transmission of nutrition by the blood.

Type of Graft. This should always be *autogenous,* made up of the four bony layers, *i. e.,* periosteum, cortex, endosteum and medulla. It must be so placed that the adaptation is perfect, that each layer of graft exactly corresponds with a similar layer of the receiving bone.

Supplementary Grafts. Small fragments placed along the principal graft furnish additional nuclei for osseous proliferation, and are very useful.

The Graft Should Be the Principal Agent of Fixation. The graft must by itself assure the fixation, without aid of any metallic plate or other foreign material, because the metabolism of the graft and the proliferation of bone tissue are directly influenced by the stimulation produced by the transmission of resistance by the graft.

Suture Material. Only the minimum amount of absorbable material should be used. Kangaroo tendon is perfect—solid, resistant, well-tolerated, completely absorbed. For the skin and soft parts, an absorbable material is employed.

Postoperative Fixation. The cast is kept on for from six to eight weeks, as long as the *x*-ray shows it necessary. Hence the absorbable sutures for skin; cast must not be removed before the time fixed on.

Diagnosis of Malignancy by X-Ray and Microscopic Examination of Sections of Tissues. E. Reissman states that pathologic conditions of bone present two distinct manifestations to the *x*-ray, namely bone destruction and bone production. Either one of these processes is present no matter what the disease may be. The most important point to the surgeon is, of course, whether the disease is benign or malignant.

The roentgenologist draws his conclusion from the following four cardinal points: the origin of the tumor; bone production; the cortex; and invasion.

First: Point of origin will determine whether the growth originates in the medullary canal or from the cortex of periosteum.

Second: Bone production does not occur in carcinoma or giant-cell sarcoma.

Third: From the cortex we can determine whether it is destroyed or not and if not, whether it is expanded. We can also see if the growth originates from cortex or periosteum.

Fourth: Invasion; if the growth infiltrates the bone and soft tissue it is malignant.

Sarcoma is common while carcinoma in the young can usually be ruled out unless a primary growth is found.

Periosteal sarcoma of the bone arises from the periosteum, produces new bone and extends perpendicular to the shaft into the soft tissues.

THE JOINTS.

The Nutrition of Articular Cartilage. From experience in the laboratories of the Cambridge Research Hospital, T. S. P. Stangeways[4] concludes that articular cartilage is nourished from vessels of adjoining structures such as those which lie beneath the synovial membrane, even after separation from normal attachment. There is every evidence, he says, that articular cartilage, even after separation and while lying free in a joint cavity, receives its nourishment from the synovial fluid in which it is bathed. This would seem to explain the changes which are found in the degenerative types of arthritis.

Treatment of Flail and Stiff Joints. Robert Jones[5] states that one of the common products of the results of war injuries is the flail joint; in other words, the pseud-

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(4) Brit. Med. Jour., May 15, 1920.
(5) Ibid., Feb. 7, 1920.

arthrosis which is of very imperfect function because the bones forming it do not come in contact, and in consequence the lever is imperfect because it has no fulcrum.

The flail joint may follow as a direct result of, (*a*) excision, (*b*) the removal of large comminuted masses of bone, (*c*) the direct loss of bone from missiles and, (*d*) the extrusion of necrosed bone during sepsis.

Methods of Prevention. (1) The extent of excision should be strictly limited, subject only to conditions of safety; (2) extensions applied should be very moderate; (3) ankylosis should be aimed at rather than mobility.

All muscular attachments should be spared. Extensions applied to a joint, when necessary at all, should be of the very lightest kind and maintained for the shortest period possible.

Treatment of Flail Joints. A proportion of flail joints are infected and discharging. When possible they should be treated by excision of sinuses, scars, and infected bone.

Whether operated on or not, the bone surfaces should be approximated and retained in the best functional position.

A proportion of cases take up their slack and result in a much firmer pseudarthrosis or ankylosis.

Where all wounds are healed the joints should be placed in a functional position either by means of a splint or plaster. The bones should be insinuated into juxtaposition to each other without crumpling the soft tissue between them. Absolute immobility must be maintained continuously for at least three months. Attempts may be made at improving the stability by operation in cases in which the muscles governing the joints may be reasonably expected to recover strength. The operation consists of removal of intervening scar tissue, bringing the bone in contact and maintaining that position by means of an absorbable material.

Flail Hip: If the head and neck of the femur are gone, all that is needed is to correct deformity which obstructs walking. If the leg can not bear weight a jointed caliper should be applied. Ankylosis can be produced by a sliding graft into a prepared acetabulum.

Flail Knee: Ankylosis is the only practical treatment. If the bones are in good condition all that is needed is to saw the ends and fix them.

Flail Ankle: This condition is rare and the treatment will lie between ankylosis and amputation.

Flail Shoulder: Abduction and careful muscle re-education may result in a joint, preferred by some people to ankylosis. The very flail joint should be firmly ankylosed. A less extensive operation is usually insufficient. After all ankylosing operations the arm should be immobilized for three months.

Flail Elbow: There are two methods of treatment: the non-operative and the operative. The non-operative consists of the approximation of the bone ends, counteracting the effect of gravity, and in muscle re-education and development. Afterward, the wearing of apparatus is necessary. The operative treatment aims at the formation of a bony ankylosis or a mobile arm with stability. The use of non-absorbable material is inadvisable, as the blood-supply is usually poor.

Pseudarthrosis of the Elbow: The best operation is dovetailing the humerus into a V-shaped cut in the radius and ulna with the interposition of fascia.

Flail Wrist: This is so rare that one need only say that ankylosis should be performed if function is likely to be benefited by it.

Treatment of Stiff Joints. The stiff joints following war wounds have to be handled with much greater care than stiffness due to prolonged immobilization of the joint, as latent sepsis is often present in the neighborhood of healed war-wounds. Rigidity is sometimes so marked that surgeons have failed to make any impression on it by attempts at forcible movement, a procedure of doubtful wisdom. Such cases will often yield to the influence of gravity and gradual pressure.

When treating a stiff knee-joint, a long posterior splint, bent to an angle of fifteen degrees, is firmly applied to the extended limb, the lower end of the splint and heel being kept unsupported. As the limb flexes, the angle of splint flexion may be gradually increased, but a few days rest should be allowed before each increase in flexion is made. If the knee becomes firmly fixed in its new angle it is proof that the treatment is premature or useless.

NERVE INJURIES.

Nerve Flap Operations. Byron Stookey[9] discusses the futility of bridging defects in nerve-continuity by the method of turning down flaps from either the proximal or distal portion of the trunk of the nerves. This method, formerly discarded as of no value, and unfavorably regarded by both the British and French schools, has recently been brought to notice once more. The most valuable evidence in the matter is the work of Huber, who performed seven operations on the ulnar nerves of dogs by this technique. In all of the cases, examination by physiologic and histologic methods disclosed no evidence of regeneration.

Stookey reviews the literature carefully, and draws the following conclusions:

The repair of nerve defects by means of nerve flaps has not been definitely supported clinically, as evidenced by a clinical study of reported cases.

It has been shown experimentally that nerve flaps do not serve as conducting paths for the down-growing neuraxes.

Nerve flaps, whether central or peripheral, are merely degenerated partial nerve segments. Continuity of neuraxes does not take place at the point of suture.

To avoid fallacious deductions it is important to distinguish between the level of the injury of the nerve trunk and the level at which muscular branches arise.

Abnormal communicating branches are not rare, particularly between the median and the ulnar nerves. Such anomalies must be taken into consideration in any careful study of nerve injuries.

Judging from the level of the lesion, muscles must not be presumed to be paralyzed, but must be demonstrated to be paralyzed.

Total movements must not be offered as evidence of return of function. The action of individual muscles must be given.

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(9) Surg. Gynec. and Obstet., September, 1919.

Reports of peripheral nerve injuries, to be of value, must be accompanied by motor, sensory, and electrical findings.

By the nerve flap the growing neuraxes are prevented from reaching the muscles through the muscular branches.

The nerve-flap method to bridge nerve defects should be discarded in peripheral nerve surgery.

[Stookey's conclusions are sound and rational. If nerve impulses are to be carried, there must be a direct route from origin to distribution. The flap method is illogical and is predestined to failure. There has been much discussion and experimentation about the other methods of bridging defects in continuity; tubulization with fascia, with hardened arteries of animals, and with prepared membranes has been tried many times, and with a very few apparent successes. There is a pronounced determination on the part of the neurofibrillae to grow downward toward the distal segment, and it would seem rational to expect them to grow through a tube and form a proper connection, but they do it so seldom that the operation is hardly worth while. The best methods so far devised, when the defect can not be sufficiently shortened by flexing the neighboring joints, are, first, to shorten the bones (a method too seldom used in this country), and second, to interpose one or more pieces of a sensory nerve removed from the same individual. The internal cutaneous nerve in the upper arm, the radial in the forearm, and the external saphenous in the back of the calf furnish sufficient material. It is often necessary to use several sections of these smaller nerves to make up sufficient bulk. Lewis and Huber call this a "cable transplant." The name is excellent, and the operation is one which should be learned by all who may be called upon to do peripheral nerve surgery.

The whole problem can be stated in a few words: Do an end-to-end suture of a divided nerve whenever it is reasonably possible; if the ends can not be brought into apposition without tension, perform a cable transplant operation and trust in God.—Ed.]

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